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US006165478	49	1 - 49
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L9	L7 and immunising	18	L9
L8	L7 and immunis?	0	L8
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L1	chlamydia	1703	L1

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Search Results - Record(s) 1 through 10 of 18 returned.

☐ 1. Document ID: US 6391589 B1

L9: Entry 1 of 18 File: USPT May 21, 2002

US-PAT-NO: 6391589
DOCUMENT-IDENTIFIER: US 6391589 B1

TITLE: Human chemokine beta-10 mutant polypeptides

DATE-ISSUED: May 21, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Olsen; Henrik S.	Gaithersburg	MD		
Li; Haodong	Gaithersburg	MD		
Adams; Mark D.	North Potomac	MD		
Gentz; Solange H. L.	Rockville	MD		
Alderson; Ralph	Gaithersburg	MD		
Li; Yuling	Germantown	MD		
Parmelee; David	Rockville	MD		
White; John R.	Coatsville	PA		
Appelbaum; Edward R.	Blue Bell	PA		

US-CL-CURRENT: 435/69.5; 424/85.1, 435/252.3, 435/254.11, 435/320.1, 435/325, 435/471, 435/71.1, 435/71.2, 514/12, 514/2 , 514/8, 530/324, 536/23.1, 536/23.5

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

☐ 2. Document ID: US 6387628 B1

L9: Entry 2 of 18 File: USPT May 14, 2002

US-PAT-NO: 6387628
DOCUMENT-IDENTIFIER: US 6387628 B1

TITLE: Mass spectrometric detection of polypeptides

DATE-ISSUED: May 14, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Little; Daniel	Boston	MA		
Koster; Hubert	La Jolla	CA		
Higgins; G. Scott	Paisley			GBX
Lough; David	Berwickshire			GBX

US-CL-CURRENT: 435/6; 435/91.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

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☐ 3. Document ID: US 6372473 B1

L9: Entry 3 of 18 File: USPT Apr 16, 2002

US-PAT-NO: 6372473
DOCUMENT-IDENTIFIER: US 6372473 B1

TITLE: Tissue plasminogen activator-like protease

DATE-ISSUED: April 16, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Moore; Paul A.	Germantown	MD		
Ruben; Steven M.	Olney	MD		
Ebner; Reinhard	Gaithersburg	MD		

US-CL-CURRENT: 435/212; 435/217, 530/327, 530/328, 530/350, 530/827, 530/828

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

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☐ 4. Document ID: US 6322970 B1

L9: Entry 4 of 18 File: USPT Nov 27, 2001

US-PAT-NO: 6322970
DOCUMENT-IDENTIFIER: US 6322970 B1

TITLE: Mass spectrometric detection of polypeptides

DATE-ISSUED: November 27, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Little; Daniel	Boston	MA		
Koster; Hubert	La Jolla	CA		
Higgins; G. Scott	Paisley			GBX
Lough; David	Berwickshire			GBX

US-CL-CURRENT: 435/6; 435/4, 435/69.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

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☐ 5. Document ID: US 6303755 B1

L9: Entry 5 of 18 File: USPT Oct 16, 2001

US-PAT-NO: 6303755
DOCUMENT-IDENTIFIER: US 6303755 B1

TITLE: Therapeutic multispecific compounds comprised of anti-FCA receptor antibodies

DATE-ISSUED: October 16, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Deo; Yashwant M.	Audubon	PA		
Graziano; Robert	Frenchtown	NJ		
Keler; Tibor	Ottsville	PA		

US-CL-CURRENT: 530/387.3; 530/387.7, 530/387.9, 530/388.1, 530/388.2, 530/388.22, 530/388.25, 530/388.3, 530/388.4, 530/388.5, 530/388.6, 530/388.7, 530/388.8, 530/395

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 6. Document ID: US 6290970 B1

L9: Entry 6 of 18 File: USPT Sep 18, 2001

US-PAT-NO: 6290970
DOCUMENT-IDENTIFIER: US 6290970 B1

TITLE: Transferrin receptor protein of Moraxella

DATE-ISSUED: September 18, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yang; Yan-Ping	Willowdale			CAX
Myers; Lisa E.	Guelph			CAX
Harkness; Robin E.	Willowdale			CAX
Klein; Michel H.	Willowdale			CAX

US-CL-CURRENT: 424/251.1; 424/184.1, 424/190.1, 424/234.1, 424/250.1, 514/2, 530/350, 530/412

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 7. Document ID: US 6274342 B1

L9: Entry 7 of 18 File: USPT Aug 14, 2001

US-PAT-NO: 6274342
DOCUMENT-IDENTIFIER: US 6274342 B1

TITLE: Nucleic acid molecules encoding monocyte chemotactic protein 5 (MCP-5) molecules and uses therefor

DATE-ISSUED: August 14, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Gutierrez-Ramos; Jose-Carlos	Marblehead	MA		
Jia; Gui-Quan	Cambridge	MA		
Gonzalo; Jose-Angel	Cambridge	MA		

US-CL-CURRENT: 435/69.5; 435/252.3, 435/254.11, 435/325, 435/471, 435/6, 435/69.7,

435/71.1, 435/71.2, 530/351, 536/23.1 , 536/23.4, 536/23.5, 536/24.3

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 8. Document ID: US 6193966 B1

L9: Entry 8 of 18 File: USPT Feb 27, 2001

US-PAT-NO: 6193966
DOCUMENT-IDENTIFIER: US 6193966 B1

TITLE: Therapeutic multispecific compounds comprised of anti-Fc.alpha. receptor antibodies

DATE-ISSUED: February 27, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Deo; Yashwant M.	Audubon	PA		
Graziano; Robert	Frenchtown	NJ		
Keler; Tibor	Ottsville	PA		

US-CL-CURRENT: 424/136.1; 424/133.1, 424/134.1, 424/178.1, 424/184.1, 424/204.1, 424/205.1, 424/234.1, 424/274.1, 514/12 , 514/2, 530/387.3, 530/388.1, 530/395

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 9. Document ID: US 6190668 B1

L9: Entry 9 of 18 File: USPT Feb 20, 2001

US-PAT-NO: 6190668
DOCUMENT-IDENTIFIER: US 6190668 B1

TITLE: Transferrin receptor protein of moraxella

DATE-ISSUED: February 20, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yang; Yan-Ping	Willowdale			CAX
Myers; Lisa E.	Guelph			CAX
Harkness; Robin E.	Willowdale			CAX
Klein; Michel H.	Willowdale			CAX

US-CL-CURRENT: 424/251.1; 435/7.1, 435/7.8, 435/70.2, 530/387.1, 530/412, 530/417

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 10. Document ID: US 6168943 B1

L9: Entry 10 of 18 File: USPT Jan 2, 2001

US-PAT-NO: 6168943

DOCUMENT-IDENTIFIER: US 6168943 B1

TITLE: Methods for making modified recombinant vesiculoviruses

DATE-ISSUED: January 2, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rose; John K.	Guilford	CT		

US-CL-CURRENT: 435/239; 424/199.1, 424/224.1, 424/93.21, 435/235.1, 435/320.1, 435/325, 514/44, 536/23.72

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L9: Entry 11 of 18 File: USPT Dec 26, 2000

US-PAT-NO: 6165478
DOCUMENT-IDENTIFIER: US 6165478 A

TITLE: DNA encoding Chlamydia pneumoniae antigenic polypeptide

DATE-ISSUED: December 26, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Izutsu; Hiroshi	Ibaraki			JPX
Obara; Kazuhiko	Ibaraki			JPX
Matsumoto; Akira	Okayama			JPX

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Hitachi Chemical Company, Ltd.				JPX	03

APPL-NO: 8/ 809326 [PALM]
DATE FILED: March 19, 1997

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	6-224711	September 20, 1994
JP	7-106006	April 28, 1995
JP	7-106008	April 28, 1995
JP	7-106009	April 28, 1995
JP	7-106010	April 28, 1995
JP	7-106011	April 28, 1995

PCT-DATA:

APPL-NO	DATE-FILED	PUB-NO	PUB-DATE	371-DATE	102(E)-DATE
PCT/JP95/01896	September 20, 1995	WO96/09320	Mar 28, 1996	Mar 19, 1997	Mar 19, 1997

INT-CL: [7] A61 K 39/118

US-CL-ISSUED: 424/263.1; 435/6, 435/7.36, 435/69.1, 435/69.3, 435/252.3, 435/320.1, 536/23.1, 536/23.4
US-CL-CURRENT: 424/263.1; 435/252.3, 435/320.1, 435/6, 435/69.1, 435/69.3, 435/7.36, 536/23.1, 536/23.4

FIELD-OF-SEARCH: 536/23.1, 536/23.4, 435/69.1, 435/252.3, 435/320.1, 435/6, 435/7.36, 435/69.3, 424/263.1

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected | Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	5085986	February 1992	Mauck et al.	435/7.36
☐	5281518	January 1994	Campbell et al.	435/6
☐	5318892	June 1994	Watanabe et al.	435/7.36

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
64-500083	January 1989	JPX	
4-297871	October 1992	JPX	
5-317097	December 1993	JPX	
WO 87/06617	November 1987	WOX	
WO 94/04549	March 1994	WOX	

OTHER PUBLICATIONS

Medline AN94253314 (Iijima et al., J. Clinical Microbiology 32(3) Mar. 1994, 583-8).
Fukushi et al, Intl.J.Systematic Bacteriology, 43:613-617, Jul. 1993.
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Ijima et al, J.Clin.Microbiology 32(3):583-588, Mar. 1994.
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Kanamoto et al., 1993, Microbiol. Immunol. 37:495-498.
Kikuta et al., 1991, Infection & Immunity 59:4665-4669.
Kornak et al., 1991, Infection & Immunity 59:721-725.
Melgosa et al., 1991, Infection & Immunity 59:2195-2199.
Derwent WPI Accession No.: 91-334458.
Derwent WPI Accession No.: 94-011050.
Freidank et al.,"Identification of Chlamydia pneumoniae-specific protein antigens in immunoblots" Clinical Microbiology and Infectious Disease, 1993, vol. 12, No. 12, pp. 947-951, abstract, table 1, Fig. 1; p. 950, right column; p. 951, left column.
Melgosa et al., "Isolation and characterization of a gene encoding a Chlamydia pneumoniae 76-kilodalton protein containing a species-specific epitope" Infection and Immunity, 1994, vol. 62, No. 3, pp. 880-886.
Tong et al., "Detection of Chlamydia peumoniae and Chlamydia psittaci in sputum samples by PCR" Journal of Clinical Pathology, 1993, vol. 46, pp. 313-317.
Tjhie et al., "Detection of Chlamydia pneumoniae using a general Chlamydia polymerase chain reaction with species differentiation after hybridisation", Journal of Microbiological Methods, 1993, vol. 18, pp. 137-150.
Supplementary European Search Report for Application No. EP 95 93 2194 with Communication dated Oct. 5, 1999.

ART-UNIT: 168
PRIMARY-EXAMINER: Stucker; Jeffrey
ASSISTANT-EXAMINER: Winkler; Ulrike
ATTY-AGENT-FIRM: Pennie & Edmonds LLP

ABSTRACT:

Chlamydia pneumoniae antigenic polypeptides, which comprise polypeptide A containing a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO: 1; DNAs encoding said antigenic polypeptides, or DNAs complementary thereto; recombinant vectors carrying said DNAs; transformants containing said recombinant vectors; a method for production of an anti-Chlamydia pneumoniae antibody, wherein the antigenic polypeptide is used as an antigen; fused proteins of an antigenic polypeptide of Chlamydia pneumoniae with dihydrofolate reductase, in which polypeptide A containing a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO: 1 is bound to the polypeptide of SEQ ID NO: 14 either directly or via an intervening amino

acid or amino acid sequence; DNAs encoding the fused proteins, or DNAs complementary thereto; recombinant vectors carrying the DNAs; transformants containing said recombinant vectors; a method for production of an anti-Chlamydia pneumoniae antibody; probes and primers for detection and/or measurement of Chlamydia pneumoniae gene; a method for detection and/or measurement of Chlamydia pneumoniae gene, wherein the probe or primer is used; reagents for detection and/or measurement of Chlamydia pneumoniae gene, which comprise the probe or primer; and agents for diagnosis of Chlamydia pneumoniae infections, which comprise the probe or primer as an active ingredient.

45 Claims, 0 Drawing figures

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L9: Entry 11 of 18 File: USPT Dec 26, 2000

US-PAT-NO: 6165478
DOCUMENT-IDENTIFIER: US 6165478 A

TITLE: DNA encoding Chlamydia pneumoniae antigenic polypeptide

DATE-ISSUED: December 26, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Izutsu; Hiroshi	Ibaraki			JPX
Obara; Kazuhiko	Ibaraki			JPX
Matsumoto; Akira	Okayama			JPX

US-CL-CURRENT: 424/263.1; 435/252.3, 435/320.1, 435/6, 435/69.1, 435/69.3, 435/7.36, 536/23.1, 536/23.4

CLAIMS:

What is claimed is:

1. A purified, isolated or synthesized DNA encoding a Chlamydia pneumoniae antigenic polypeptide, or a purified, isolated or synthesized DNA complimentary and identical in length thereto, wherein said polypeptide consists of a polypeptide A containing a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO: 1.

2. The purified, isolated or synthesized DNA of claim 1, which consists of the base sequence of SEQ ID NO: 3.

3. The purified, isolated or synthesized DNA of claim 1, which consists of the base sequence of SEQ ID NO: 4.

4. The purified, isolated or synthesized DNA of claim 1, which consists of the base sequence of SEQ ID NO: 7.

5. A recombinant vector carrying the DNA of claim 1.

6. A Recombinant vector of claim 5, which consists of the base sequence of SEQ ID NO: 10.

7. A recombinant vector carrying the DNA of claim 2.

8. A recombinant vector carrying the DNA of claim 3.

9. A recombinant vector carrying the DNA of claim 4.

10. A transformant containing the recombinant vector of claim 5.

11. A transformant containing the recombinant vector of claim 6.

12. A transformant containing the recombinant vector of claim 7.

13. A transformant containing the recombinant vector of claim 8.

14. A transformant containing the recombinant vector of claim 9.

15. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 1, wherein said polypeptide A is a polypeptide in which at least one amino acid is deleted from the polypeptide of SEQ ID NO:1.

16. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 1, wherein said polypeptide A is a polypeptide in which at least one amino acid in the polypeptide of SEQ ID NO:1 is replaced with another amino acid or a polypeptide in which at least one amino acid is added in the polypeptide of SEQ ID NO:1.

17. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 1, wherein said polypeptide A is a polypeptide in which an amino acid or a peptide sequence is bound to a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO:1.

18. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 1, wherein said polypeptide A is a polypeptide containing the amino acid sequence of SEQ ID NO:1.

19. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 1, wherein said polypeptide A is a polypeptide containing the amino acid sequence of SEQ ID NO:2.

20. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 1, wherein said polypeptide A is a polypeptide containing the amino acid sequence of SEQ ID NO:5.

21. A purified, isolated or synthesized DNA encoding a fused protein of a Chlamydia pneumoniae antigenic polypeptide with dihydrofolate reductase or a purified, isolated or synthesized DNA complimentary and identical in length thereto, in which a polypeptide B containing a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO:1 is bound to the polypeptide of SEQ ID NO:14 either directly or via an intervening amino acid or amino acid sequence.

22. The purified, isolated or synthesized DNA of claim 21, which consists of the base sequence of SEQ ID NO: 17.

23. The purified, isolated or synthesized DNA of claim 21, which consists of the base sequence of SEQ ID NO: 18.

24. A recombinant vector carrying the DNA of claim 21.

25. A recombinant vector carrying the DNA of claim 22.

26. A recombinant vector carrying the DNA of claim 23.

27. A recombinant vector of claim 26 which is plasmid pCPN533T.

28. A transformant containing the recombinant vector of claim 24.

29. A transformant containing the recombinant vector of claim 25.

30. A transformant containing the recombinant vector of claim 26.

31. A transformant containing the recombinant vector of claim 27.

32. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 21, wherein said polypeptide B is a polypeptide in which at least one amino acid is deleted from the polypeptide of SEQ ID NO:1.

33. The purified, isolated or synthesized DNA or the purified, isolated or synthesized

DNA complementary and identical in length thereto of claim 21, wherein said polypeptide B is a polypeptide in which at least one amino acid in the polypeptide of SEQ ID NO:1 is replaced with another amino acid or a polypeptide in which at least one amino acid is added in the polypeptide of SEQ ID NO:1.

34. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 21, wherein the fused protein is a polypeptide containing the amino acid sequence of SEQ ID NO:15.

35. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 21, wherein the fused protein is a polypeptide containing the amino acid sequence of SEQ ID NO:16.

36. A probe for detection and/or measurement of a Chlamydia pneumoniae gene, which comprises any one of

(a) a purified, isolated or synthesized DNA consisting of a sequence of at least 10 consecutive bases in the DNA of SEQ ID NO: 3,

(b) a purified, isolated or synthesized DNA complementary and identical in length to DNA (a), or

(c) a purified, isolated or synthesized DNA having at least 90% homology to DNA (a) or (b).

37. The probe of claim 35, which consists of the base sequence of SEQ ID NO: 19.

38. The probe of claim 35, which consists of the base sequence of SEQ ID NO: 20.

39. A reagent for detection and/or measurement of a Chlamydia pneumoniae gene, which comprises the probe of any one of claims 36-38.

40. A reagent for diagnosis of a Chlamydia pneumoniae infection, which comprises the probe of any one of claims 36-38 as an active ingredient.

41. A primer for detection and/or measurement of a Chlamydia pneumoniae gene, which comprises any one of

(a) a purified, isolated or synthesized DNA consisting of a sequence of at least 10 consecutive bases in the DNA of SEQ ID NO: 3,

(b) a purified, isolated or synthesized DNA complementary and identical in length to DNA (a), or

(c) a purified, isolated or synthesized DNA having at least 90% homology to DNA (a) or (b).

42. The primer of claim 40, which consists of the base sequence of SEQ ID NO: 19.

43. The primer of claim 40, which consists of the base sequence of SEQ ID NO: 20.

44. A reagent for detection and/or measurement of a Chlamydia pneumoniae gene, which comprises the primer of any one of claims 40-42.

45. A reagent for diagnosis of a Chlamydia pneumoniae infection, which comprises the primer of any one of claims 40-42 as an active ingredient.

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L9: Entry 15 of 18 File: USPT Jul 6, 1999

US-PAT-NO: 5919620
DOCUMENT-IDENTIFIER: US 5919620 A

TITLE: Heat shock protein HSP72 of Streptococcus pneumoniae

DATE-ISSUED: July 6, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Brodeur; Bernard R.	Sillery			CAX
Martin; Denis	St.-Augustin			CAX
Hamel; Josee	Sillery			CAX

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Biochem Vaccines Inc.	Ste-Foy			CAX	03

APPL-NO: 8/ 472534 [PALM]
DATE FILED: June 7, 1995

INT-CL: [6] C12 Q 1/06, C12 Q 1/68, C12 P 21/06, G01 N 33/53

US-CL-ISSUED: 435/6; 435/4, 435/69.1, 435/963, 536/23.4, 536/23.7
US-CL-CURRENT: 435/6; 435/4, 435/69.1, 435/963, 536/23.4, 536/23.7

FIELD-OF-SEARCH: 435/4, 435/963, 435/69.1, 435/6, 536/23.7, 536/23.4

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected | Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	5288639	February 1994	Burnie et al.	

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
WO 89/12455	December 1989	WOX	
WO 90/02564	March 1990	WOX	

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ART-UNIT: 182
PRIMARY-EXAMINER: Housel; James C.

ASSISTANT-EXAMINER: Swartz; Rodney P.
ATTY-AGENT-FIRM: Foley & Lardner

ABSTRACT:

A heat shock protein of Streptococcus pneumoniae named HSP72 and immunologically related polypeptides, the nucleotide and derived amino acid sequences of HSP72 (SEQ ID NO:4; SEQ ID NO:5), antibodies that bind to HSP72, and recombinant DNA methods for the production of HSP72 and immunologically related polypeptides. The polypeptides, DNA sequences and antibodies of this invention provide new means for the diagnosis, prevention and/or treatment of disease.

4 Claims, 20 Drawing figures

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L9: Entry 11 of 18 File: USPT Dec 26, 2000

DOCUMENT-IDENTIFIER: US 6165478 A
TITLE: DNA encoding Chlamydia pneumoniae antigenic polypeptide

Abstract Paragraph Right (1):
Chlamydia pneumoniae antigenic polypeptides, which comprise polypeptide A containing a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO: 1; DNAs encoding said antigenic polypeptides, or DNAs complementary thereto; recombinant vectors carrying said DNAs; transformants containing said recombinant vectors; a method for production of an anti-Chlamydia pneumoniae antibody, wherein the antigenic polypeptide is used as an antigen; fused proteins of an antigenic polypeptide of Chlamydia pneumoniae with dihydrofolate reductase, in which polypeptide A containing a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO: 1 is bound to the polypeptide of SEQ ID NO: 14 either directly or via an intervening amino acid or amino acid sequence; DNAs encoding the fused proteins, or DNAs complementary thereto; recombinant vectors carrying the DNAs; transformants containing said recombinant vectors; a method for production of an anti-Chlamydia pneumoniae antibody; probes and primers for detection and/or measurement of Chlamydia pneumoniae gene; a method for detection and/or measurement of Chlamydia pneumoniae gene, wherein the probe or primer is used; reagents for detection and/or measurement of Chlamydia pneumoniae gene, which comprise the probe or primer; and agents for diagnosis of Chlamydia pneumoniae infections, which comprise the probe or primer as an active ingredient.

Brief Summary Paragraph Right (1):
The invention relates to Chlamydia pneumoniae antigenic polypeptides, fused proteins containing the polypeptides, DNAs coding therefor, recombinant vectors carrying the DNAs, transformants containing the recombinant vectors, a method for production of antibody, a method and reagents for detection and/or measurement of antibody, a method and agents for diagnosis of Chlamydia pneumoniae infections, probes and primers for detection and/or measurement of Chlamydia pneumoniae gene, and a method and reagents for detection and/or measurement of Chlamydia pneumoniae gene. The invention can be effectively used in the pharmaceutical industry, particularly in the preparation of agents for diagnosis of Chlamydia pneumoniae infections.

Brief Summary Paragraph Right (2):
Several kinds of species are known in Chlamydia, that is, Chlamydia trachomatis, Chlamydia psittaci, Chlamydia pecorum, Chlamydia pneumoniae and the like. Chlamydia trachomatis causes trachoma, venereal lymphogranuloma, urogenital infections, inclusion conjunctivitis, neonatal pneumonia and the like. Chlamydia psittaci causes psittocosis and the like. Chlamydia pneumoniae causes respiratory infections, atypical pneumonia and the like.

Brief Summary Paragraph Right (3):
Since the symptoms of infections in the respiratory apparatus which are caused by Chlamydia pneumoniae are similar to those of infections caused by Mycoplasma pneumoniae or Influenza virus, physicians often make a wrong diagnosis. Hence, there is a need for the development of a simple method for diagnosing the infections caused by Chlamydia pneumoniae.

Brief Summary Paragraph Right (4):
In general, an infection can reliably be diagnosed by detecting the causative bacterium in the infected site or by detecting an antibody against the causative bacterium in body fluids such as a sera and the like. The former method is called an

antigen test and the latter is called an antibody test. Both of them are clinically important. As for Chlamydia pneumoniae, there is known an antibody test which is carried out by a method in which an antibody is detected by using an elementary body of Chlamydia pneumoniae.

Brief Summary Paragraph Right (5):
However, this method has the disadvantage that the elementary body of Chlamydia pneumoniae reacts not only with an antibody against Chlamydia pneumoniae but also with antibodies against other species of Chlamydia, thus being fairly unspecific. This is because the elementary body of Chlamydia pneumoniae contains an antigen which is also present in other species of geneus Chlamydia than Chlamydia pneumoniae, that is, Chlamydia trachomatis and Chlamydia psittaci.

Brief Summary Paragraph Right (8):
As for Chlamydia pneumoniae, there is known a genetic screening method which is carried out as disclosed in Japanese Unexamined Patent Publication No. Sho 64-500083, U.S. Pat. No. 5,281,518 and WO94/04549.

Brief Summary Paragraph Right (9):
However, Japanese Unexamined Patent Publication No. Sho 64-500083 and U.S. Pat. No. 5,281,518 only disclose that a chromosomal DNA of Chlamydia pneumoniae or a DNA fragment which is obtained by cleaving the chromosomal DNA with a restriction enzyme or the like is used as a probe. The base sequences of these DNA molecules are not determined and the specificity of these probes are therefore unclear. In addition, it is difficult to determine the reaction conditions.

Brief Summary Paragraph Right (11):
It is an object of the invention to provide antigenic polypeptides that do not react with antibodies against species of geneus Chlamydia other than Chlamydia pneumoniae, such as Chlamydia trachomatis, Chlamydia psittaci and the like and which react only with a Chlamydia pneumoniae-specific antibody and can thereby detect the Chlamydia pneumoniae-specific antibody.

Brief Summary Paragraph Right (13):
A further object of the invention is to provide a method for production of an anti-Chlamydia pneumoniae-specific antibody, a method and reagents for detection and/or measurement of the anti-Chlamydia pneumoniae-specific antibody, and agents for diagnosis of Chlamydia pneumoniae infections, all by using said antigenic polypeptides.

Brief Summary Paragraph Right (14):
A still further object of the invention is to provide probes and primers for detecting and/or measuring specifically Chlamydia pneumoniae gene, a method and reagents for detection and/or measurement of Chlamydia pneumoniae gene and agents for diagnosis of Chlamydia pneumoniae infections, all by using the probes or primers.

Brief Summary Paragraph Right (15):
An even further object of the invention is to provide antigenic polypeptides for detection of an antibody which reacts with geneus Chlamydia including Chlamydia pneumoniae, Chlamydia trachomatis, Chlamydia psittaci and the like.

Brief Summary Paragraph Right (19):
The antigen polypeptide of the present invention is formed of polypeptides containing at least five continued amino acid sequences in a polypeptide of SEQ ID No. 1 (hereinafter referred to as "Polypeptide A") from the viewpoint of the minimum size in which a peptide is allowed to possess antigenicity.

Brief Summary Paragraph Right (20):
Since the antigen-antibody reaction can be expected to gain in sensitivity in proportion as the length of amino acid sequence increases, the polypeptide A is appropriately formed of not less than 20, preferably not less than 100, and more preferably not less than 250 amino acids.

Brief Summary Paragraph Right (21):
So long as the polypeptide A possesses the antigenicity inherent in Chlamydia

pneumoniae, it tolerates the loss of amino acids (1-250 amino acids, for example) from the polypeptide of SEQ ID No. 1. If the number of missing amino acids is unduly large, the polypeptide A will tend to suffer the antigenicity inherent in Chlamydia pnuemoniae to be impaired.

Brief Summary Paragraph Right (22):
When the number of missing amino acids is large (five or more, for example), the polypeptide A prefers such missing amino acids (five or more, for example) to occur in a continued series for the sake of retaining the antigenicity of Chlamydia pneumoniae.

Brief Summary Paragraph Right (23):
So long as the polypeptide A possesses the antigenicity inherent in Chlamydia pneumoniae, it tolerates the substitution of part of the amino acids (1-100 amino acids, for example) by other amino acids or the insertion of amino acids (1-100 amino acids, for example) in the polypeptide of SEQ ID No. 1. If the number of amino acids involved in the substitution or insertion is unduly large, the polypeptide A will tend to suffer the antigenicity inherent in Chlamydia pnuemoniae to be impaired. When the number of amino acids involved in the substitution or insertion is large (five or more, for example), the polypeptide A prefers the amino acids (five or more, for example) to occur in a continued series for the sake of retaining the antigenicity of Chlamydia pneumoniae. The amino acids to be involved in the substitution are preferred to possess such similar qualities as are observed in the substitution between glycine and alanine, for example.

Brief Summary Paragraph Right (24):
So long as the polypeptide A possesses the antigenicity inherent in Chlamydia pneumoniae, it may be a polypeptide having amino acids or peptides ligated directly or through the medium of an intervening amino acid sequence to at least five continued amino acid sequences in the polypeptide of SEQ ID No. 1.

Brief Summary Paragraph Right (25):
The peptides for the ligation are appropriately formed of not more than 1000 amino acid sequences, preferably not more than 500 amino acid sequences, and more preferably not more than 200 amino acid sequences for the sake of retaining the antigenicity inherent in Chlamydia pneumoniae.

Brief Summary Paragraph Right (27):
As concrete examples of the polypeptide A using DHFR or .beta.-galactosidase as a peptide, DHFR-Chlamydia pneumoniae antigen polypeptide-fused protein and .beta.-galactosidase-Chlamydia pneumoniae antigen polypeptide-fused protein may be cited. DHFR or .beta.-galactosidase may be ligated either directly or through the medium of an intervening amino acid sequence with Chlamydia pneumoniae antigen polypeptide.

Brief Summary Paragraph Right (29):
Though the intervening amino acid sequence is not defined particularly, the amino acid sequences of leucine and leucine-methionine are examples.

Brief Summary Paragraph Right (30):
As concrete examples of the fused protein of the present invention, the polypeptide formed of amino acid sequences of SEQ ID No. 15 and the polypeptide formed of amino acid sequences of SEQ ID No. 16 may be cited.

Brief Summary Paragraph Right (31):
Among the fused proteins cited above, the polypeptide formed of the amino acid sequences of SEQ ID No. 15 including the whole antigen polypeptide of 53 kDa of Chlamydia pneumoniae proves particularly advantageous.

Brief Summary Paragraph Right (33):
The polypeptide of SEQ ID No. 1 of this invention is an antigen polypeptide formed of 488 amino acid residues as shown in the table of sequences.

Brief Summary Paragraph Right (34):
The polypeptide of SEQ ID No. 2 of this invention is an antigen polypeptide formed of

271 amino acid residues as shown in the table of sequences.

Brief Summary Paragraph Right (35):
The polypeptide of SEQ ID No. 5 of this invention is an antigen polypeptide formed of 259 amino acid residues as shown in the table of sequences.

Brief Summary Paragraph Right (36):
Among other antigen polypeptides mentioned above, the polypeptide of SEQ ID No. 1 containing the whole antigen polypeptide of 53 kDa of Chlamydia pnuemoniae proves particularly advantageous.

Brief Summary Paragraph Right (38):
Among the methods of chemical synthesis is counted the MAP (multiple antigen peptide) method, for example. The MAP method befits the synthesis of a peptide formed of not more than 30 amino acid sequences. This synthesis can be implemented by the use of a commercially available peptide synthesizing device.

Brief Summary Paragraph Right (44):
The .lambda. phage obtained by screening (see infra) is already a kind of recombinant vector carrying the DNA of the invention. Additional recombinant vectors can be prepared by inserting in a known plasmid vector or phage vector the DNA encoding the Chlamydia pneumoniae antigenic polypeptide (see infra) in a conventional procedure. In this case, a linker may be used if necessary. As the known plasmid vector, pBR322, pUC18, pUC19, pBBK10MM or the like can be used. Plasmids pBR322, pUC18 and pUC19 are commercially available and pBBK10MM is described in detail in Japanse Unexamined Patent Publication No. Hei 4-117284. As the phage vector, .lambda. gt11 phage, .lambda. gt10 phage or the like can be used. In any case, recombinant vectors corresponding to the parent vectors used can be obtained.

Brief Summary Paragraph Right (49):
The DNA molecule encoding the Chlamydia pneumoniae antigenic polypeptide (see infra) is ligated to the DNA molecule encoding DHFR (see infra) by means of a commercially available kit. In the ligation, a linker may be used if necessary. A DNA ligation kit (Takara Shuzo Co., Ltd) can be used as a commercially available kit. If the DNA obtained by the ligation does not have a replication origin and does not therefore function as a plasmid, the DNA is inserted in a separate plasmid vector, which may be pBR322, pUC18 or the like.

Brief Summary Paragraph Right (58):
Either the solution of the precipitate in a small amount of buffer solution or the supernatant is fractionated by liquid chromatography. The proteins contained in the fractions are blotted by the Western blotting method using a Chlamydia pneumoniae-specific monoclonal antibody to obtain the fractions containing antigen polypeptide. When the polypeptide A is a protein fused with DHFR, a Methotrexate column can be used as the column for the liquid chromatography. Specific procedures of the removal of residues such as a cell membrane and the like, the removal of DNA by addition of streptomycin sulfate, the recovery of proteins by addition of ammonium sulfate and a Western blotting method are described in "Molecular Cloning".

Brief Summary Paragraph Right (59):
In the invention, the DNA encoding the polypeptide of SEQ ID NO: 1 means DNAs selected from the group of DNAs which are obtained by translating the amino acids of the polypeptide of SEQ ID NO: 1 to triplets in accordance with the genetic code (each amino acid is assigned 1-6 sets of nucleotide sequences). This group of DNAs includes the DNA of SEQ ID NO: 3.

Brief Summary Paragraph Right (60):
The DNA encoding the antigenic polypeptide A means DNAs encoding the polypeptide A. These DNAs are selected from the group of DNAs which are obtained by translating the amino acid sequence for the polypeptide A to triplets in accordance with the genetic code.

Brief Summary Paragraph Right (61):
As the polypeptide A, those polypeptides which have been described under the item "Antigenic Polypeptides" above may be given. As the DNA encoding the polypeptide A,

nucleotides sequences which correspond to the amino acid sequences for those polypeptides may be given.

Brief Summary Paragraph Right (65):
DNAs encoding the fused proteins comprise codons corresponding to the amino acid sequence of the fused protein. The DNAs include but are not limited to the DNAs of SEQ ID NOs: 17 and 18.

Brief Summary Paragraph Right (66):
The base sequence of SEQ ID No. 17 is the base sequence of the DNA coding for the fused protein of DHFR and the whole antigen polypeptide of 53 kDa of Chlamydia pneumoniae and the base sequence of SEQ ID No. 18 is the base sequence of the DNA coding for the fused protein of DHFR and (part of) the antigen polypeptide of 53 kDa of Chlamydia pneumoniae.

Brief Summary Paragraph Right (68):
Among the methods of chemical synthesis is counted the phosphoamidite method which fits the synthesis of a DNA formed in a length of not more than 100 base sequences. This chemical synthesis can be attained by a commercially available DNA synthesizing device.

Brief Summary Paragraph Right (69):
Among the methods of gene recombination are counted a method for cloning the DNA from the elementary body of Chlamydia pneumoniae in the manner already described and the PCR method utilizing the already acquired DNA as a template and using a primer manufactured by adopting the base sequence at a position arbitrarily selected in that DNA. The method of gene recombination is capable of manufacturing a long DNA of more than 100 bases.

Brief Summary Paragraph Right (70):
Now, the method for cloning the DNA coding for the antigen polypeptide from the elementary body of Chlamydia pneumoniae will be described in detail below.

Brief Summary Paragraph Right (71):
A suspension of cells is prepared from cultured HL cells. The supernatant of the culture is removed and the suspension of Chlamydia pneumoniae is then added to the resulting cell sheet. After incubation, Chlamydia pneuminiae-infected HL cells are obtained by centrifugation. As Chlamydia pneumoniae, strain YK41 (Y. Kanamoto et al., Micro biol. Immunol., Vol. 37, p.495-498, 1993) can be used.

Brief Summary Paragraph Right (72):
The Chlamydia pneuminiae-infected HL cells are disrupted and centrifuged, thereby recovering the supernatant. The obtained supernatant is layered onto a continuous density gradient solution containing Urografin (Schering) is centrifuged.

Brief Summary Paragraph Right (73):
The yellowish white band was recovered because in the preliminary experiment, it was confirmed to contain the elementary body of Chlamydia pneumoniae with the aid of an electron microscope.

Brief Summary Paragraph Right (74):
The elementary body of Chlamydia pneumoniae is suspended in 10 mM Tris-HCl buffer (pH 8.0) containing 1 mM ethylene diaminetetra acetate (EDTA) (hereinafter referred to as "TE buffer"). To the resulting suspension are added a 1% aqueous solution of sodium dodecyl sulfate (SDS) and an aqueous solution of Proteinase K (1 mg/ml) and the elementary body is lysed while incubating. To the resulting solution is added phenol saturated with 0.1 M Tris-HCl buffer (pH 8.0). The mixture is stirred and centrifuged to recover an aqueous layer. The obtained aqueous layer is treated successively with RNase and phenol/chloroform/isoamyl alcohol, followed by ethanol precipitation. As a result, genomic DNA of Chlamydia pneunomiae is obtained.

Brief Summary Paragraph Right (77):
To the resulting DNA fragments are added .lambda. gt11 DNA preliminarily digested with restriction enzyme EcoRI, ATP and T4 ligase and a reaction is conducted. The resulting recombinant .lambda. gt11 DNA is packaged with a commercially available packaging kit

to prepare a gemonic DNA expression library.

Brief Summary Paragraph Right (78):
Cultured cells of E. coli strain Y1090r- are infected with the gemonic DNA expression library and incubated in an agar medium. A protein produced in the cells by the expression of the inserted DNA is transferred to a nitrocellulose filter immersed in an aqueous solution of isopropylthio-.beta.-D-galactoside (IPTG). The filter is blocked with a bovine serum albumin and washed. The filter is then reacted with a Chlamydia pneumoniae-specific monoclonal antibody. As the Chlamydia pneumoniae-specific monoclonal antibody, AY6E2E8 and SCP53 can be used. A hybridoma cell line forming AY6E2E8 has been deposited with the National Institute of Bioscience and Human-Technology, the Agency of Industrial Science and Technology (1-3, Higashi 1 chome Tsukuba-shi Ibaraki-ken 305, Japan) as FERM BP-5154 under the terms of the Budapest Treaty. A hybridoma cell line forming SCP53 is disclosed in J. Clin. Microbil., Vol.132, p.583-588, 1994. After the reaction, the filter is washed and reacted with an anti-mouse IgG antibody labeled with an enzyme such as peroxidase or the like. After the reaction, the filter is washed and reacted with a color-developing substrate solution. As the color-developing substrate solution, a mixture of an aqueous solution of hydrogen peroxide and a solution of 4-chloro-1-naphthol in methanol can be used. After the reaction, the filter is washed and dried in air.

Brief Summary Paragraph Right (79):
Plaques corresponding to the color-developing spots on the filter are identified and .lambda. phage contained in the plaques is obtained. The above procedure is repeated until all the plaques react with the aforementioned monoclonal antibody. As a result, the DNA encoding an antigenic polypeptide is cloned and .lambda. phage expressing the Chlamydia pneumoniae-specific antigenic polypeptide having reactivity with the Chlamydia pneumoniae-specific monoclonal antibody is obtained.

Brief Summary Paragraph Right (80):
E. coli strain Y1090r- is infected with the obtained .lambda. phage and cultured to yield a large amount of .lambda. phage. DNA molecules are obtained and purified from the .lambda. phage using a commercially available kit. To the obtained DNA molecules are added a primer, Taq polymerase and deoxynucleotides. The steps of heating, cooling and incubating are repeated, thereby amplifying the DNA molecule inserted in .lambda. gt11. .lambda. gt11 forward primer and .lambda. gt11 reverse primer (Takara Shuzo Co. Ltd.) can be used as primers and AmpliTaq DNA polymerase can be used as a Taq polymerase. A general procedure of DNA amplification is known as the PCR method, which is described in detail in J. Sambrook et al., Molecular Cloning, 2nd ed., Cold Spring Harbor Laboratory Press (1989) (hereinafter referred to as "Molecular Cloning").

Brief Summary Paragraph Right (81):
The amplified DNA is obtained and its base sequence is determined and analyzed. The amplified DNA can be obtained with a commercially available kit such as Wizard PCR Prep kit (Promega). The base sequence can be determined by fluorescence-labeled terminator cycle sequencing using Taq polymerase. This sequencing can be performed with a kit commercially available from Perkin-Elmer Japan. For analysis of the base sequence, a commercially available apparatus such as Model 373A DNA Sequencer (Applied Biosystems) can be used.

Brief Summary Paragraph Right (82):
Following the determination of the base sequence, the base sequence of the DNA is analyzed using a DNA sequencing software package such as DNASIS (Hitachi Software Engineering) to estimate an editing, junctional and amino acid-translational regions.

Brief Summary Paragraph Right (83):
If it is found that a full-length gene has not been obtained, DNA molecules upstream and downstream of the available DNA are obtained by genome walking. The genome walking can be performed with a kit commercially available from Takara Shuzo Co., Ltd.

Brief Summary Paragraph Right (87):
The primer to be used in the latter method can be designed and synthesized in consideration of base sequences at the 5' and 3' ends of DNA encoding DHFR. For example, an oligonucleotide having the 1-20 sequence in the base sequence of SEQ ID NO: 17 and one having a sequence complementary to the 461-480 sequence in the base

sequence of SEQ ID NO: 5 can be used. These oligonucleotides can be synthesized chemically with a commercially available DNA synthesizer.

Brief Summary Paragraph Right (88):
In the antigen polypeptides mentioned above, the polypeptide of SEQ ID NO. 1 containing the whole antigen polypeptide of 53 kDa of Chlamydia pneumoniae is particularly preferred.

Brief Summary Paragraph Right (89):
An anti-Chlamydia pneumoniae antibody can be produced by immunizing a mouse with the antigenic polypeptide of the invention as an antigen, separating a spleen cell from the immunized mouse, fusing the spleen cell with a myeloma cell line to produce hybridomas, selecting a hybridoma recognizing the Chlamydia pneumoniae 53 kDa antigenic polypeptide from the produced hybridomas and culturing the selected hydridoma.

Brief Summary Paragraph Right (91):
The anti-Chlamydia pneumoniae antibody is produced by a known general procedure for obtaining antibodies by immunization of mouse, except that the antigenic polypeptide of the invention is used as an antigen.

Brief Summary Paragraph Right (92):
A method for detection and/or measurement of an anti-Chlamydia pneumoniae antibody comprises, for example, the steps of immobilizing the antigenic polypeptide on a support, applying a sample, washing, adding a labeled secondary antibody, washing and detecting and/or measuring the label either directly or indirectly.

Brief Summary Paragraph Right (99):
Reagents for detection and/or measurement of the anti-Chlamydia pneumoniae antibody using the antigenic polypeptide of interest as an antigen include the antigenic polypeptides which are immobilized on a support and those with which the necessary amounts of the secondary antibody and the substrate are enclosed.

Brief Summary Paragraph Right (100):
The aforementioned reagents can be used as agents for diagnosis of Chlamydia pneumoniae infections.

Brief Summary Paragraph Right (101):
DNA encoding the Chlamydia pneumoniae 53 kDa antigenic polypeptide has the base sequence of SEQ ID NO: 3.

Brief Summary Paragraph Right (103):
The length of the base sequence of the probes and primers is preferably 10-50 bp, more preferably 15-20 bp.

Brief Summary Paragraph Right (104):
Specific examples of the probes and primers of the invention include a DNA comprising the base sequence of SEQ ID NO: 19 and a DNA comprising the base sequence of SEQ ID NO: 20.

Brief Summary Paragraph Right (107):
Exemplary labels include chemical compounds such as biotin, avidin, streptoavidin, digoxigenin and the like; enzymes such as alkaline phosphatase, luciferase, peroxidase, .beta.-galactosidase and the like; and fluorescent compounds such as fluorescein and the like. Biotin may be bound to the probes by, for example, adding biotinated deoxyuridine 5'-triphosphate to the probes in the presence of a terminal transferase. A kit containing a terminal transferase and biotinated deoxyuridine 5'-triphosphate can be purchased from Boehringer Mannheim. In the case where a label other than biotin is to be bound, a commercially available kit can also be used. Such a kit can be purchased from Takara Shuzo Co., Ltd and TOYOBO CO., LTD. Alternatively, the label may be bound by a method described in "Molecular Cloning".

Brief Summary Paragraph Right (109):
RNAs corresponding to the base sequences of the probes and primers of the invention, that is, nucleic acids in which thymine is replaced with uracil in the base moiety and

in which deoxyriboses are replaced with riboses in the sugar chain, can be used as the probes and primers of the invention instead of the aforementioned probes and primer comprising DNAs as structural units. These probes and primers comprising RNAs as structural units can be used in the method and reagents for detection and/or measurement of the invention.

Brief Summary Paragraph Right (110):
Chlamydia pneumoniae gene is detected and/or measured by, for example, separating DNA in a sample on the basis of the difference in molecular weight by elecrophoresis, transferring the obtained DNA to a nitrocellulose filter, nylon membrane filter or the like for its identification, adding the labeled probe of the invention, and detecting and/or measuring the label. This method is called the Southern blotting technique and its general procedure is described in "Molecular Cloning".

Brief Summary Paragraph Right (111):
Chlamydia pneumoniae gene is detected and/or measured with the primer of the invention by, for example, the PCR method which was described above. The method for detecting and/or measuring Chlamydia pneumoniae gene by PCR using the primer of the invention comprises the following steps.

Brief Summary Paragraph Right (119):
In another embodiment of the invention, after steps (i)-(iii), the primer of the invention may be replaced with one having another base sequence and steps (i)-(iii) are repeated, followed by step (iv).

Brief Summary Paragraph Right (120):
An exemplary reagent for detection and/or measurement of Chlamydia pneumoniae gene according to the invention is an aqueous solution of the probe or primer of the invention which is packed frozen in a plastic container.

Brief Summary Paragraph Left (4):
Preparation of Recombinant Vectors Carrying the DNA Encoding Fused Protein of the Chlamydia pneumoniae Antigenic Polypeptide with DHFR and Transformants Containing the Same

Brief Summary Paragraph Left (6):
Culture of Chlamydia pneumoniae

Brief Summary Paragraph Left (7):
Purification of Elementary Body of Chlamydia pneumoniae

Brief Summary Paragraph Left (8):
Preparation of Genomic DNA of Chlamydia pneumoniae

Brief Summary Paragraph Left (11):
Production of DNA Encoding the Chlamydia pneumoniae-Specific Antigenic Polypeptide

Brief Summary Paragraph Left (13):
Method of Production of Anti-Chlamydia pneumoniae Antibody by Using the Antigenic Polypeptide as Antigen

Brief Summary Paragraph Left (14):
Method and Reagents for Detection and/or Measurement of Anti-Chlamydia pneumoniae Antibody Using the Antigenic Polypeptide as Antigen, and Agents for Diagnosis of Chlamydia pneumoniae Infections Comprising the Antigenic Polypeptide as Active Ingredient

Brief Summary Paragraph Left (15):
Probes and Primers for Detection and/or Measurement of Chlamydia pneumoniae Gene

Brief Summary Paragraph Left (16):
Method for Detection and/or Measurement of Chlamydia pneumoniae Gene

Brief Summary Paragraph Left (17):
Reagents for Detection and/or Measurement of Chlamydia pneumoniae Gene

Brief Summary Paragraph Type 1 (1):
(1) A Chlamydia pneumoniae antigenic polypeptide, which comprises polypeptide containing a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO: 1 (hereinafter referred to as "polypeptide A").

Brief Summary Paragraph Type 1 (4):
(4) The antigenic polypeptide of (1), wherein said polypeptide A is a polypeptide in which an amino acid or a peptide sequence is bound to a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO: 1.

Brief Summary Paragraph Type 1 (5):
(5) The antigenic polypeptide of (1), wherein said polypeptide A is a polypeptide containing the amino acid sequence of SEQ ID NO: 1.

Brief Summary Paragraph Type 1 (6):
(6) The antigenic polypeptide of (1), wherein said polypeptide A is a polypeptide containing the amino acid sequence of SEQ ID NO: 2 .

Brief Summary Paragraph Type 1 (7):
(7) The antigenic polypeptide of (1), wherein said polypeptide A is a polypeptide containing the amino acid sequence of SEQ ID NO: 5.

Brief Summary Paragraph Type 1 (9):
(9) The DNA of (8), which contains the base sequence of SEQ ID NO: 3.

Brief Summary Paragraph Type 1 (10):
(10) The DNA of (8), which contains the base sequence of SEQ ID NO: 4.

Brief Summary Paragraph Type 1 (11):
(11) The DNA of (8), which contains the base sequence of SEQ ID NO: 7.

Brief Summary Paragraph Type 1 (13):
(13) The recombinant vector of (12), which is plasmid pCPN533 .alpha. containing the base sequence of SEQ ID NO: 10.

Brief Summary Paragraph Type 1 (15):
(15) A method for production of an anti-Chlamydia pneumoniae antibody,

Brief Summary Paragraph Type 1 (17):
(16) A method for detection and/or measurement of an anti-Chlamydia pneumoniae antibody, wherein the antigenic polypeptide of any one of (1)-(7) is used as an antigen.

Brief Summary Paragraph Type 1 (18):
(17) A reagent for detection and/or measurement of an anti-Chlamydia pneumoniae antibody, which comprises the antigenic polypeptide of any one of (1)-(7) as an antigen.

Brief Summary Paragraph Type 1 (19):
(18) A reagent for diagnosis of a Chlamydia pneumoniae infection, which comprises the antigenic polypeptide of any one of (1)-(7) as an active ingredient.

Brief Summary Paragraph Type 1 (20):
(19) A fused protein of a Chlamydia pneumoniae antigenic polypeptide with dihydrofolate reductase, in which polypeptide containing a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO: 1 is bound to the polypeptide of SEQ ID NO: 14 (hereinafter referred to as "polypeptide B") either directly or via an intervening amino acid or amino acid sequence.

Brief Summary Paragraph Type 1 (23):
(22) The fused protein of (19), which is a polypeptide containing the amino acid sequence of SEQ ID NO: 15.

Brief Summary Paragraph Type 1 (24):

(23) The fused protein of (19), which is a polypeptide containing the amino acid sequence of SEQ ID NO: 16.

Brief Summary Paragraph Type 1 (26):
(25) The DNA of (24), which contains the base sequence of SEQ ID NO: 17.

Brief Summary Paragraph Type 1 (27):
(26) The DNA of (24), which contains the base sequence of SEQ ID NO: 18.

Brief Summary Paragraph Type 1 (31):
(30) A method for production of an anti-Chlamydia pneumoniae antibody, wherein the fused protein of any one of (19)-(23) is used as an antigen.

Brief Summary Paragraph Type 1 (32):
(31) A method for detection and/or measurement of an anti-Chlamydia pneumoniae antibody, wherein the fused protein of any one of (19)-(23) is used as an antigen.

Brief Summary Paragraph Type 1 (33):
(32) A reagent for detection and/or measurement of an anti-Chlamydia pneumoniae antibody, which comprises the fused protein of any one of (19)-(23) as an antigen.

Brief Summary Paragraph Type 1 (34):
(33) A reagent for diagnosis of a Chlamydia pneumoniae infection, which comprises the fused protein of any one of (19)-(23) as an active ingredient.

Brief Summary Paragraph Type 1 (35):
(34) A probe for detection and/or measurement of Chlamydia pneumoniae gene, which comprises any one of

Brief Summary Paragraph Type 1 (36):
(35) The probe of (34), which contains the base sequence of SEQ ID NO: 19.

Brief Summary Paragraph Type 1 (37):
(36) The probe of (34), which contains the base sequence of SEQ ID NO: 20.

Brief Summary Paragraph Type 1 (38):
(37) A method for detection and/or measurement of Chlamydia pneumoniae gene, characterized in that the probe of any one of (34)-(36) is used.

Brief Summary Paragraph Type 1 (39):
(38) A reagent for detection and/or measurement of Chlamydia pneumoniae gene, which comprises the probe of any one of (34)-(36).

Brief Summary Paragraph Type 1 (40):
(39) An agent for diagnosis of a Chlamydia pneumoniae infection, which comprises the probe of any one of (34)-(36) as an active ingredient.

Brief Summary Paragraph Type 1 (41):
(40) A primer for detection and/or measurement of Chlamydia pneumoniae gene, which comprises any one of

Brief Summary Paragraph Type 1 (42):
(41) The primer of (40), which contains the base sequence of SEQ ID NO: 19.

Brief Summary Paragraph Type 1 (43):
(42) The primer of (40), which contains the base sequence of SEQ ID NO: 20.

Brief Summary Paragraph Type 1 (44):
(43) A method for detection and/or measurement of Chlamydia pneumoniae gene, wherein the primer of any one of (40)-(42) is used.

Brief Summary Paragraph Type 1 (45):
(44) A reagent for detection and/or measurement of Chlamydia pneumoniae gene, which comprises the primer of any one of (40)-(42).

Brief Summary Paragraph Type 1 (46):
(45) A reagent for diagnosis of a Chlamydia pneumoniae infection, which comprises the primer of any one of (40)-(42) as an active ingredient.

Brief Summary Paragraph Type 1 (47):
(46) A Chlamydia pneumoniae antigenic polypeptide, which is selected from the group consisting of

Brief Summary Paragraph Type 1 (48):
(47) A Chlamydia pneumoniae antigenic polypeptide, which is selected from the group consisting of

Brief Summary Paragraph Type 1 (54):
(a) a DNA containing a sequence of at least 10 consecutive bases in the DNA of SEQ ID NO: 3,

Brief Summary Paragraph Type 2 (1):
(a) a DNA containing a sequence of at least 10 consecutive bases in the DNA of SEQ ID NO: 3,

Brief Summary Paragraph Type 2 (4):
(a) a DNA containing a sequence of at least 10 consecutive bases in the DNA of SEQ ID NO: 3,

Detailed Description Paragraph Right (2):
Now, the component steps of the process from the culture of host cells of Chlamydia pneumoniae through the determination of gene DNA sequence/amino acid sequence of the antigenic polypeptide of Chlamydia pneumoniae will be described below in the order of their occurrence.

Detailed Description Paragraph Right (5):
From the culture solution of the HL cells propagated in a 6-well plastic culture vessel (on the bottom surface thereof), the supernatant was removed with a pipet. The residual cell sheet in the culture vessel, after adding 2 ml per well of the suspension of the YK41 strain of Chlamydia pneumoniae (Kanamoto et al., Microbiol. Immunol., Vol. 37, p.495-498, 1993) [the supernatant obtained by diluting a preserved solution of Chlamydia pneumoniae YK41 to 12 to 24 times the original volume with an aqueous solution containing 75 g of sucrose, 0.52 g of monopotassium phosphate, 1.22 g of dipotassium phosphate, and 0.72 g of glutamic acid liter (hereinafter referred to as "SPG"), treating the diluted solution with a supersonic wave for one minute, and subjecting the resultant diluted solution to centrifugal separation at 2,000 rpm for three minutes], was subjected to centrifugal adsorption at 2,000 rpm for one hour. After the centrifugal adsorption, the Chlamydia pneumoniae suspension was removed from the resultant cell sheet. The residual cell sheet, after adding 4 ml per well of a Dulbecco MEM culture medium containing 1 .mu.g of cyclo-heximide per ml and 10% (v/v) of bovine fetal serum, was cultured at 36.degree. C. for three days under an ambience containing 5% (v/v) carbon dioxide gas. After this culture, the cells adhering to the culture vessel were separated with a sterilized silicone blade and recovered. The cells were centrifuged at 8,000 rpm for 30 minutes. The sediment obtained consequently was resuspended in SPG and the resultant suspension was put to storage at -70.degree. C.

Detailed Description Paragraph Right (6):
The frozen suspension of HL cells infected with the Chlamydia pneumoniae YK41 preserved at -70.degree. C. was melted and homogenized by the use of a homogenizer. The homogenate was centrifugally separated at 2,500 rpm for 10 minutes and the supernatant consequently formed was recovered. The sediment was again suspended in SPG and treated in the same manner as described above to recover a new supernatant. This procedure was repeated twice more. The successive supernatants were joined into one volume.

Detailed Description Paragraph Right (7):
Separately, in a centrifuging tube, a 0.03M tris-hydrochloride buffer (pH 7.4) containing 50% (w/v) sucrose was placed, then a mixed solution of 3 parts by volume of urografin 76% (produced by Schering Corporation) with 7 parts by volume of 0.03M tris

hydrochloride buffer (pH 7.4) was superposed, and subsequently the supernatant recovered as described above was attentively superposed on the layer of the mixed solution. The superposed layers in the centrifuging tube were centrifuged at 8,000 rpm for one hour. The layer of the 0.03M tris hydrochloride buffer (pH 7.4) containing 50% (w/v) sucrose and the sediment were recovered from the tube. The recovered solution and SPG added thereto in an equal volume were subjected to centrifugation at 10,000 rpm for 30 minutes. From the resultant separated phases, the supernatant was discarded and the sediment was suspended in SPG. In the centrifuging tubes, continuous density-gradient solutions consisting 35% to 50% of Urografin 76% (produced by Schering Corporation) in 0.03M tris hydrochloride buffer (pH 7.4) (ratios by volume of the former component to the total volume of solution) were placed and the suspension mentioned above was superposed thereon. The superposed layers in the tubes were centrifuged at 8,000 rpm for one hour. When a small amount of the yellowish white band was sampled and observed under an electron microscope, it was found to contain the elementary body of Chlamydia pneumoniae. So, this band was recovered and diluted with SPG to twice the original volume, and centrifuged at 10,000 rpm for 30 minutes. The sediment obtained in consequence of the centrifugation was suspended in SPG, assayed for protein concentration (with the aid of a protein analysis kit produced by Biorad Corp, with bovine serum albumin as a standard), and put to storage at -70.degree. C.

Detailed Description Paragraph Right (8):
Three hundred (300) .mu.l of a suspension of the elementary body of the purified Chlamydia pneumoniae YK-41 strain mentioned above (protein concentration: 1.37 mg/ml) was centrifuged at 4.degree. C. at 12,000 rpm for five minutes. The resultant sediment was suspended in 500 .mu.l of 10 mM tris buffer (pH 8.0) containing 1 mM EDTA (hereinafter referred to as "TE buffer"). The same centrifugation was repeated and the resultant sediment was suspended in 300 .mu.l of TE buffer. The produced suspension and 30 .mu.l of an aqueous 2% SDS solution and 30 .mu.l of an aqueous solution of 1 mg/ml proteinase K added thereto were incubated at 56.degree. C. for 30 minutes to effect solution of the elementary body. The incubated solution and 350 .mu.l of phenol-saturated 0.1M tris hydrochloride buffer (pH 8.0) added thereto were thoroughly stirred with a vortex mixer. The resultant mixture was centrifuged at 4.degree. C. at 12,000 rpm for five minutes. From the separated layers, the aqueous layer was recovered (for extraction of DNA). This procedure of extraction was repeated once more. The aqueous layer and 2 .mu.l of a 10 mg/ml RNase solution added thereto were incubated at 37.degree. C. for two hours to effect decomposition of RNA. The incubated solution and 300 .mu.l of a mixed solution consisting of a phenol-saturated 0.1M tris-hydrochloride buffer (pH 8.0), chloroform, and isoamyl alcohol at a volumetric ratio of 25:24:1 (hereinafter referred to as "PCI") were thoroughly stirred with a vortex mixer. The resultant mixture was centrifuged at 4.degree. C. at 12,000 rpm for five minutes. From the separated layers, the aqueous layer was recovered. This procedure was repeated until a fifth time.

Detailed Description Paragraph Right (11):
The partially digested DNA consequently obtained was dissolved in 20 .mu.l of purified water. The amount 19 .mu.l of the DNA solution and 14 .mu.l of a linker (20 pmole/.mu.l) represented by the following base sequence, 4.5 .mu.l of 10 mM ATP, 4.5 .mu.l of a 0.2M tris-hydrochloride buffer (pH 7.6; hereinafter referred to as "tenfold concentration ligation grade buffer") containing 50 mM MgCl.sub.2, 50 mM dithiothreitol, and 500 .mu.g/ml bovine serum albumin, 2 .mu.l of purified water, and 1 .mu.l of T4 ligase added thereto were left reacting at 16.degree. C. for four hours to effect addition of the linker.

Detailed Description Paragraph Right (13):
The amount 0.6 .mu.l of the resultant aqueous solution and 1 .mu.l of .lambda. gt11 DNA (1 .mu.g/.mu.l, produced by Stratagene Corp.) cleaved in advance with a restriction endonuclease EcoRI, 0.5 .mu.l of a tenfold concentration ligation grade buffer, 0.5 .mu.l of 10 mM ATP, 0.4 .mu.l of T4 ligase, and 2 .mu.l of purified water added thereto were left reacting overnight at 4.degree. C. Then, the recombinant .lambda. gt11 DNA consequently obtained was packaged by the use of a packaging kit (produced by Stratagene Corp. and marketed under trademark designation of Gigapack II Gold").

Detailed Description Paragraph Right (20):
The purified elementary body of the Chlamydia pneumoniae YK 41 strain was solubilized

with 1% (w/v) SDS, dialyzed against a 0.05M sodium bicarbonate buffer solution (pH 9.6) containing 0.02% of sodium azide, diluted until the protein concentration reached a level in the range of 1-10 .mu.g/ml, dispensed 50 .mu.l each to the wells of a 96-well EIA grade plate made of vinyl chloride, and left standing at rest overnight at 4.degree. C. to induce adsorption of the antigen. The supernatant was removed. 150 .mu.l of the PBS containing 0.02% (w/v) Tween 20 was added to the wells and the plate was left standing at rest for three minutes. The wells were deprived of the PBS and cleaned. After the wells were given a cleaning treatment once more, 100 .mu.l of the PBS containing 1% (v/v) bovine serum albumin was added to the wells and left standing at rest overnight at 4.degree. C. to effect blocking. The wells were deprived of the PBS containing the bovine serum albumin, cleaned twice in the same manner as above with the PBS containing 0.02% (w/v) Tween 20 and, after adding 50 .mu.l of the culture supernatant of the fused cells, left at rest at room temperature for two hours. The wells were cleaned three times in the same manner as above with the PBS containing 0.02% (w/v) Tween 20 and, after adding 50 .mu.l of the goat anti-mouse IgG antibody (25 ng/ml) labeled with peroxidase, left standing at rest at room temperature for two hours. The wells were cleaned three times in the same manner as above with the PBS containing 0.02% (w/v) Tween 20 and, after adding 50 .mu.l of the ABTS solution (produced by KPL Corp.), left standing at rest at room temperature for 15 minutes--one hour to induce a coloring reaction. The contents of the wells were tested for absorbance at 405 nm by the use of a 96-well EIA plate grade photometer.

Detailed Description Paragraph Right (29):
The elementary body of Chlamydia pnuemoniae was dissolved to obtain the peptide contained in the elementary body. The peptide and the monoclonal antibody mentioned above were subjected to the Western blotting to determine the specificity of the acquired monoclonal antibody.

Detailed Description Paragraph Right (30):
As a result, the acquired monoclonal antibody was found to be capable of recognizing the Chlamydia pneumoniae 53 kDa antigen polypeptide.

Detailed Description Paragraph Right (31):
A hybridoma 70 was acquired in the same manner as the hybridoma AY6E2E8. When the monoclonal antibody producing the hybridoma 70 was tested for specificity by following the procedure described above, it was found that this monoclonal antibody was capable of recognizing the Chlamydia pneumoniae 73 kDa antigen polypeptide.

Detailed Description Paragraph Right (34):
The filter was immersed in a 0.1% bovine serum albumin-containing solution of a 20 mM tris-hydrochloride buffer (pH 7.5) containing 150 mM NaCl (hereinafter referred to as "TBS buffer") and shaken at 37.degree. C. for one hour to effect a blocking reaction thereon. Then, the filter was washed twice with the TTBS buffer, immersed in the 10 .mu.g/ml TTBS solution of a monoclonal antibody specific to Chlamydia pneumoniae, and shaken at 37.degree. C. for one hour. The filter was washed three times with the TTBS buffer and then shaken in a peroxidase-labelled anti-mouse IgG antibody solution (TTBS buffer, 50 ng/ml) at 37.degree. C. for one hour. The filter was washed three times with the TTBS buffer and three times with the TBS buffer, then immersed in a color ground substance solution (prepared by adding 60 .mu.l of an aqueous 30% hydrogen peroxide solution and 20 ml of a methanolic 0.3% 4-chloro-1-naphthol solution to 100 ml of the TBS buffer), and left standing therein at room temperature for about 30 minutes. At the time that the filter was thoroughly colored, this filter was extracted from the solution, washed with purified water, and air-dried.

Detailed Description Paragraph Right (36):
As a result, the .lambda. phage which expressed a Chlamydia pneumoniae-specific antigen polypeptide reactive with a Chlamydia pneumoniae-specific monoclonal antibody was obtained and designated as 53-3S .lambda. phage.

Detailed Description Paragraph Right (37):
Plaques were formed by following the procedure described in (F) above. One of the plaques was recovered, placed in 100 .mu.l of the SM buffer, and left standing therein at 4.degree. C. overnight to effect extraction of the .lambda. phage. In the LB culture medium in which 250 .mu.l of the Y1090r- strain of Escherichia coli was cultured overnight, 5 to 10 .mu.l of the .lambda. phage solution was placed and left

standing therein at 37.degree. C. for 20 minutes to effect infection of the Escherichia coli with the .lambda. phage. The infected Escherichia coli was inoculated to 50 ml of the LB culture medium containing 10 mM magnesium sulfate and kept warm in advance at 37.degree. C. and shaken cultured therein at 37.degree. C. for five to seven hours until the bacteriolysis of the Escherichia coli by the .lambda. phage occurred. The resultant culture solution, after adding 250 .mu.l of chloroform, was centrifuged at 3,000 rpm for 10 minutes to effect removal of the residual cells of Escherichia coli and obtain a suspension of the .lambda. phage. The .lambda. phage DNA was purified by the use of a special device (produced by Promega Corp. and marketed under trademark designation of "Wizard .lambda. Preps Kit").

Detailed Description Paragraph Right (38):
A 600 .mu.l grade microtube was charged with 61.5 .mu.l of purified water, 10 .mu.l of a tenfold concentration of reaction buffer (a tris-hydrochloride buffer, pH 8.3, containing 500 mM KCl, 15 mM MgCl.sub.2, and 0.01% gelatin), 1 .mu.l of 20 mM dNTP, 0.1 .mu.l of 53-3S .lambda. phage DNA solution, 1 .mu.l of 20 nM .lambda. gt11 forward primer (produced by Takara Shuzo Co., Ltd.), 1 .mu.l of 20 nM .lambda. gt11 reverse primer (produced by Takara Shuzo Co., Ltd.), and 0.5 .mu.l of AmpliTaq DNA Polymerase, with two or three drops of mineral oil placed to form a top layer. The contents of the microtube were subjected to 30 circles of incubation, each consisting of 30 seconds' standing at 94.degree. C. 30 seconds' standing at 55.degree. C., and two minutes' standing at 73.degree. C. to effect amplification of the DNA. After the reaction, the reaction solution was subjected to 1.2% low-melting temperature agarose gel electrophoresis to excise the amplified DNA. This amplified DNA was purified by the use of "Wizard PCR Prep Kit" (produced by Promega Corp.).

Detailed Description Paragraph Right (39):
The analysis of the DNA for base sequence was effected by subjecting a sample to a sequence reaction in accordance with the fluorescence-labelled terminator cycle sequence method using a Taq DNA polymerase with a PCR-amplified DNA as a template and analyzing the reaction product by a DNA sequencer (produced by Applied Biosystems Corp. and marketed under product code of "Model 373A"). The DNA base sequence consequently obtained was examined by the gene sequence analysis soft (produced by Hitachi Software Engineering Co., Ltd. and marketed under trademark designation of "DNASIS") to estimate agglutination, ligation, and amino acid translation region. Consequently, the sequence was identified as SEQ ID No: 9.

Detailed Description Paragraph Right (40):
The results of the analysis of the sequence of SEQ ID No: 9 show that about 60% of the amino acid sequence of the 53 KDa antigenic polypeptide from the N terminal thereof toward the C terminal was elucidated.

Detailed Description Paragraph Right (41):
The DNA which codes for the Chlamydia pneumoniae antigen polypeptide is specific to Chlamydia pneumoniae and it has been cloned by utilizing a monoclonal antibody recognizing the 53 Kda antigen polypeptide. Thus, this DNA apparently encodes the 53 kDa antigen polypeptide.

Detailed Description Paragraph Right (42):
The search for homology of both the base sequence and the amino acid sequence of SEQ ID No: 9 was carried out in accordance with the GenBank data base confirmed absence of a known series exhibiting high homology.

Detailed Description Paragraph Right (44):
A plasmid pBBK10MM was severed with restriction enzymes of BamHI and XhoI and subjected to 1.2% low melting temperature solution agarose gel electrophoresis to excise about 4.6 Kbp of DNA fragment. This fragment was purified. The synthetic DNA's of SEQ ID No: 11 and SEQ ID No: 12 were added each in an amount of 1 ng to 100 ng of the DNA fragment and they were ligated by the use of a DNA ligation kit (produced by Takara Shuzo Co., Ltd.) The resultant reaction product was placed in an Escherichia coli HB101 strain-competent cell (produced by Takara Shuzo Co., Ltd.) to prepare a transformant and acquire a plasmid, which was designated as pADA431. This plasmid was severed with a restriction enzyme MunI and then subjected to an alkali phosphatase reaction to effect removal of the 5' phosphoric acid base.

Detailed Description Paragraph Right (45):
Separately, the 53-3S .lambda. phage DNA was severed with a restriction enzyme EcoRI. One hundred (100) ng of the pADA431 plasmid DNA severed with the restriction enzyme MunI mentioned above was added to 50 ng of the DNA fragment and they were ligated in the same manner as described above to prepare a transformant and acquire a plasmid incorporating therein the restriction enzyme EcoRI fragment of 53-3S .lambda. phage DNA, which was designated as pCPN533 .alpha.. This plasmid was a DNA of a length of about 5.7 kbp possessing a base sequence of SEQ ID No: 10 and was capable of expressing the polypeptide containing part of 53K antigenic polypeptide with a host Escherichia coli. The base sequence of the DNA coding for the polypeptide containing part of the 53K antigenic polypeptide was shown by SEQ ID No: 4. The amino acid sequence deduced from this base sequence was shown by SEQ ID No: 2. An Escherichia coli carrying the plasmid pCPN533a was subjected to culture, electrophoresis, transfer to a nitrocellulose membrane, and detection with a monoclonal antibody in the same manner as described above. As a result, the occurrence of a colored band corresponding to the polypeptide mentioned above was visually conformed. This fact indicates that the Escherichia coli carrying the plasmid pCPN533a expressed the 53K antigenic polypeptide capable of reacting with a monoclonal antibody specifically reactive with Chlamydia pneumoniae.

Detailed Description Paragraph Right (46):
A DNA possessing base sequences of SEQ ID Nos. 26 and 27 was synthesized based on the base sequence of SEQ ID No. 9 by the use of a DNA synthesizing device.

Detailed Description Paragraph Right (47):
Ten (10) .mu.l of the aqueous solution of genome DNA of the Chlamydia pneumoniae YK 41 strain (DNA content: about 1 .mu.g) obtained in Example 1 and 5 .mu.l of a K buffer concentrated to 1/10 times the original volume, 35 .mu.l of purified water, and 5 .mu.l of a limiting enzyme Hind III (19 U/.mu.l) added thereto were kept together at 37.degree. C. for three hours.

Detailed Description Paragraph Right (48):
The resultant reaction solution was extracted from phenol. The extract and ethanol added thereto were together centrifuged to obtain a precipitate. This precipitate and 5 .mu.l of the Hind III cassette DNA (20 ng/.mu.l) in the PCR in vitro Cloning Kit (proprietary designation of Takara Shuzo Co., Ltd.) and 15 .mu.l of ligation solution added thereto were kept together at 16.degree. C. for 30 minutes.

Detailed Description Paragraph Right (50):
The resultant solution and 78.5 .mu.l of purified water, 10 .mu.l of a PCR grade buffer concentrated to 1/10 times the original volume, 8 .mu.l of 2.5 mM dNTP, and 0.5 .mu.l (5 U/.mu.l) of Taq polymerase added thereto and 1 .mu.l of a DNA possessing the base sequence of SEQ ID No. 26 (20 pmol/.mu.l) and 1 .mu.l of a DNA possessing the base sequence of SED ID No. 28 (20 pmol/.mu.l) (enclosed as Primer C1 in the aforementioned kit) further added thereto as primer DNA's were placed together in a microtube, 0.6 ml in volume, with two drops of mineral oil superposed on the resultant mixture in the microtube. The mixture was subjected to 30 temperature cycles each consisting of 30 seconds at 94.degree. C., 2 minutes at 55.degree. C., and 3 minutes at 72.degree. C. This procedure will be referred to hereinafter as "PCR process."

Detailed Description Paragraph Right (51):
One (1) .mu.l of the reaction solution resulting from the PCR process and 1 .mu.l of a DNA possessing the base sequence of SEQ ID No. 27 (20 pmol/.mu.l) and 1 .mu.l of a DNA possessing the base sequence of SED ID No. 29 (20 pmol/.mu.l) (enclosed as Primer C2 in the aforementioned kit) added thereto as primer DNA's were subjected to the PCR process.

Detailed Description Paragraph Right (52):
The reaction solution resulting from the second PCR process was subjected to electrophoresis with 1.2% low melting agarose gel to separate an agarose gel containing a DNA, about 1.4 kbp in size. The Wizard PCR Prep kit (Promega Corp) was used for the purification of the DNA. The separated agarose gel and the buffer solution enclosed in the kit were together heated to dissolve the agarose gel. The purifying resin enclosed in the kit was added to the resultant solution to adsorb the DNA. The resultant mixture was centrifuged to obtain the purifying resin as a

precipitate. The precipitate was washed with propanol and centrifuged again to obtain a precipitate. Purifying water was added to the precipitate to dissolve the DNA out of the purifying resin. The resultant mixture was centrifuged to obtain a supernatant (aqueous DNA solution). The process described above will be referred to herein below as "DNA purifying process."

Detailed Description Paragraph Right (53):
The acquired aqueous DNA solution was caused to undergo a sequence reaction by the fluorescence-labeled terminator sequence method using the Taq DNA polymerase templated by the contained DNA and was analyzed for the base sequence of DNA with a DNA sequencer, Model 373A, (Applied Biosystems Corp.). The DNA base sequence consequently obtained was compiled and ligated by the software for gene sequence analysis (produced by Hitachi Software Engineering Co., Ltd. and marketed under trademark designation of "DNASIS") to estimate the amino acid translation region. The process just described will be referred to herein below as "base sequence analyzing process."

Detailed Description Paragraph Right (54):
When the acquired DNA was analyzed for base sequence, it was found that this DNA possessed about 50 bp of base sequences on the 3' terminal side of the DNA encoding the antigen polypeptide of Chlamydia pneumoniae acquired in Example 1. It was further found that about 0.7 kb of coding region containing a stop codon existed on the downstream side of the base sequence.

Detailed Description Paragraph Right (55):
A DNA possessing the base sequence of SEQ ID No. 30 was synthesized as a primer corresponding to the upstream part of the DNA encoding the antigen polypeptide of Chlamydia pneumoniae based on the base sequence of SEQ ID No. 9 and a DNA possessing the base sequence of SEQ ID No. 31 was synthesized as a primer corresponding to the downstream part of the DNA encoding the antigen polypeptide of Chlamydia pneumoniae based on the base sequence containing the aforementioned about 0.7 kb of code zone severally by the use of the DNA synthesizer.

Detailed Description Paragraph Right (56):
The PCR process was performed on 1 .mu.l of the DNA possessing the base sequence of SEQ ID No. 30 DNA and 1 .mu.l of the DNA possessing the base sequence of SEQ ID No. 31 as a primer DNA by using 1 .mu.l of the aqueous solution of the genome DNA of the Chlamydia pneumoniae YK 41 strain obtained in Example 1.

Detailed Description Paragraph Right (58):
The base sequence analyzing process mentioned above was carried out on the acquired aqueous solution of DNA.

Detailed Description Paragraph Right (59):
When the base sequence of the acquired DNA was analyzed, it was found that this DNA possessed the base sequence of SEQ ID No. 3 and encoded the amino acid sequence of SEQ ID No. 1.

Detailed Description Paragraph Right (60):
DNA coding for the entire 53 KDa antigenic polypeptide of Chlamydia pneumoniae was obtained by effecting a genome walking by the use of the plasmid pCPN533a and the DNA library of .lambda. gt11.

Detailed Description Paragraph Right (61):
The recombination vector containing the DNA coding for the whole Chlamydia pneumoniae 53 kDa antigen polypeptide and the transformant containing the vector can be manufactured as follows.

Detailed Description Paragraph Right (62):
A recombinant vector containing a DNA coding for the entire 53 KDa antigenic polypeptide of Chlamydia pneumoniae and a transformant carrying the vector are prepared by following the procedure of Example 2 using the DNA coding for the entire 53 KDa antigenic polypeptide of Chlamydia pneumoniae.

Detailed Description Paragraph Right (63):
A hybridoma 70 was acquired by the same method as used for the acquisition of a

hybridoma AY6E2E8. The murine ascites was acquired by using the hybridoma 70. The supernatant of the ascites was analyzed for the quality of the monoclonal antibody contained therein. The results of this analysis indicate that this monoclonal antibody was specific to the antigen polypeptide of 73 KDa of Chlamydia pneumoniae.

Detailed Description Paragraph Right (64):
A clone 70-2S .lambda. phage was obtained by following the procedure of Example 1 while using a monoclonal antibody 70 in the place of the monoclonal antibody SCP53 or AY6E2E8. From the phage, a sequence of SEQ ID No: 13 was obtained.

Detailed Description Paragraph Right (65):
The results of the analysis of the sequence of SEQ ID No: 13 clearly indicate that about 90% of the amino acid sequence of the 73K antigenic protein of Chlamydia pneumoniae from the N terminal toward the C terminal thereof was clarified.

Detailed Description Paragraph Right (66):
The search for homology of both the base sequence and the amino acid sequence of SEQ ID No: 13 was effected in accordance with the GenBank data base. The results of the search clearly show that these sequences exhibited high homology with the gene base sequence isolated from Chlamydia trachomatis [L. M. Sardinia et al: J. Bacteriol., Vol. 17., 335-341 (1989)].

Detailed Description Paragraph Right (67):
The anti-Chlamydia pneumoniae antibody can be produced by using the antigen polypeptide of Chlamydia pneumoniae as follows.

Detailed Description Paragraph Right (73):
The cells which allowed the occurrence of a single cellular colony in a well, produced an antibody capable of reacting with an elementary body, and achieved quick proliferation are recovered from the relevant wells and are subsequently proliferated in a 24-well plastic culture vessel. Further, a hybridoma producing an anti-Chlamydia pneumoniae antibody is obtained by repeating the same cloning process as described above. This hybridoma is cultured and the anti-Chlamydia pneumoniae antibody is produced from the resultant culture supernatant.

Detailed Description Paragraph Right (74):
The anti-Chlamydia pneumoniae antibody can be detected and measured by using the antigen polypeptide of this invention as an antigen as follows.

Detailed Description Paragraph Right (75):
The polypeptide formed of the amino acid sequence of SEQ ID No: 1 is used as an antigenic polypeptide. It is fixed on a microtiter plate, made to add a PBS containing bovine serum albumin, and left standing overnight at 4.degree. C. to effect blocking. The PBS containing the bovine serum albumin was removed and the well is washed twice with the PBS containing 0.02% (w/v) Tween 20. The blood serum from a patient is added to the well thereto and is left standing at room temperature for two hours. The resultant solution is removed and the well is washed three times with the PBS containing 0.02% (w/v) Tween 20 in the same manner as described above. In each of the wells, a peroxidase-labelled mouse anti-human IgG antibody is placed and left standing at room temperature for two hours. The solution in the well is removed and the well is washed three times with the PBS containing 0.02% (w/v) Tween 20 in the same manner as described above. In the well, an ABTS solution (produced by KPL Corp.) is placed and left standing at room temperature for 15 minutes to one hour to effect a reaction of coloration. The solution is then tested for absorbance at 405 nm by the use of a photometer for 96-well EIA plate.

Detailed Description Paragraph Right (77):
Separately, a 53-3S .lambda. phage DNA was severed with a restriction enzyme EcoRI to obtain about 1.0 Kbp of DNA fragment similarly in a purified form. This DNA segment was further severed with a restriction enzyme AvaII to obtain about 0.8 Kbp of a DNA segment similarly in a purified form. The amount 100 ng of about 4.6 Kbp of DNA segment, 100 ng of about 0.8 Kbp of DNA segment mentioned above, and 1 ng of each of the synthetic DNA's of SEQ ID Nos: 21 through 24 added thereto were subjected to DNA ligation by the use of the DNA ligation kit (produced by Takara Shuzo Co., Ltd.). The reaction product was placed in an Escherichia coli HB101 strain competent cell

(produced by Takara Shuzo Co., Ltd.) to produce a transformant.

Detailed Description Paragraph Right (78):
This transformant was spread on a LB agar culture medium containing 50 mg/L of ampicillin and cultured thereon at 37.degree. C. for 24 hours. The Escherichia coli colony consequently obtained was inoculated to 3 ml of the LB culture medium containing 50 mg/L of ampicillin and then shaken cultured overnight at 37.degree. C. The plasmid vector was separated from the culture medium by the alkali lysis method, severed with a restriction enzyme NruI, and analyzed by 0.8% agarose gel electrophoresis to select an Escherichia coli possessing a recombinant plasmid vector which had produced DNA segments of 616 bp and 4822 bp. The recombinant plasmid vector thus obtained was designated as pCPN533T. This plasmid vector was a DNA of a length of about 5.4 kbp possessing a base sequence of SEQ ID No: 25. It was capable of expressing a fused protein having a polypeptide containing part of the 53 KDa antigenic polypeptide of Chlamydia pneumoniae ligated to the C terminal of DHFR. The base sequence of the DNA coding for this fused protein was shown by SEQ ID No: 18. The amino acid sequence deduced from this base sequence was shown by SEQ ID No: 16.

Detailed Description Paragraph Right (79):
One platinum loop full of the HB101 strain of Escherichia coli retaining plasmid pCPN533T was inoculated to 3 ml of the LB culture medium containing 50 mg/l of ampicillin and shaken cultured overnight at 37.degree. C. The amount 10 .mu.l of the culture medium containing the Escherichia coli and 10 .mu.l of loading buffer (a 0.156M tris-hydrochloride buffer containing 0.01% of bromophenol blue, 10% of mercapto ethanol, 20% of glycerol, and 5% of SDS and having pH 6.8) added thereto were heated at 80.degree. C. for five minutes. The resultant reaction solution was subjected to 5-20% polyacrylamide gradient gel electrophoresis. On the anode plate of a semi-dry blotting device, one filter paper wetted with a 0.3M tris aqueous solution containing 10% of methanol and 0.05% sodium dodecyl sulfate, one filter paper wetted with a 25 mM tris aqueous solution containing 10% of methanol and 0.05% of sodium dodecyl sulfate, one filter paper wetted with a 25 mM tris aqueous solution containing 10% of methanol and 0.05% of sodium dodecyl sulfate, one nitrocellulose membrane wetted with a 25 mm tris aqueous solution containing 10% of methanol, 0.05% of sodium dodecyl sulfate, and 40 mM aminocaproic acid, the polyacryl amide gel completely undergone the aforementioned electrophoresis and two filter papers wetted with a 25 mM tris aqueous solution containing 40 mM aminocaproic acid were superposed sequentially in the order mentioned. A cathode plate was set as opposed to the anode plate across the superposed filters and an electric current was passed through the filters at a current density of 2.5 mA/cm.sup.2 for one hour to effect transfer of the protein in the polyacrylamide gel to the nitrocellulose membrane. The nitrocellulose membrane was placed in a TBS buffer containing 0.1% of bovine serum albumin and left standing therein at room temperature for not less than one hour to effect blocking. The nitrocellulose membrane was washed twice with the TTBS buffer and then shaken in a monoclonal antibody solution produced by the hybridoma SCP53 (in the 5 to 10 .mu.g/ml TTBS buffer) at 37.degree. C. for one hour. The nitrocellulose membrane was washed three times with the TTBS buffer and then shaken in an aqueous solution of an anti-mouse IgG antibody labelled with peroxidase (in the 50 ng/ml TTBS buffer) at 37.degree. C. for one hour. The nitrocellulose membrane was washed three times with the TTBS buffer and then placed in a coloring ground substance solution (obtained by mixing 100 ml of the TBS buffer with 60 .mu.l of an aqueous 30% hydrogen peroxide solution, and 20 ml of a methanolic solution of 4-chloro-1-naphthol) and left reacting at room temperature for 30 minutes. The nitrocellulose membrane was extracted, washed with purified water, and then air-dried. As a result, colored bands were observed at positions corresponding to sizes of fused protein. This fact indicates that the Escherichia coli possessing the plasmid pCPN533T expressed the fusion protein containing 53 KDa antigen capable of reacting with the monoclonal antibody specifically reacting Chlamydia pneumoniae.

Detailed Description Paragraph Right (80):
The DNA encoding the whole 53 kDa antigen polypeptide of Chlamydia pneumoniae was already acquired in Example 3. However, it was separately obtained the DNA as follows.

Detailed Description Paragraph Right (81):
A DNA coding for the entire 53 KDa antigenic polypeptide of Chlamydia pneumoniae was also obtained by effecting a genome walking by the use of the plasmid pCPN533T and the

DNA library of .lambda. gt11. When these DNAs were analyzed for base sequence, it was found to possess the 484th through 1947th base sequences of SEQ ID No: 17 and code for the 162nd through 649th amino sequences of SEQ ID No: 15.

Detailed Description Paragraph Right (82):
The recombinant vector containing the DNA encoding the fused protein of DHFR and the whole 53 kDa antigen polypeptide of Chlamydia pneumoniae and the transformant containing the recombinant vector can be produced as follows.

Detailed Description Paragraph Right (83):
A recombinant vector containing a DNA coding for the fused protein of the DHFR and the entire 53 KDa antigenic polypeptide of Chlamydia pneumoniae is produced by following the procedure of Example 8 while using a DNA coding for the plasmid pBBK10MM and the entire 53 KDa antigenic polypeptide of Chlamydia pneumoniae mentioned above and the transformant containing the recombinant vector was produced. The base sequence of the DNA coding for the fused protein is shown by SEQ ID No: 17 and the amino acid sequence deduced from this base sequence is shown by SEQ ID No: 15.

Detailed Description Paragraph Right (84):
The anti-Chlamydia pneumoniae antibody can be produced by using the fused protein of this invention as an antigen as follows.

Detailed Description Paragraph Right (85):
A hybridoma producing an anti-Chlamydia pneumoniae antibody is obtained by following the procedure of Example 6 while using the fused protein mentioned above as an antigen for immunization. This hybridoma is cultured and the anti-Chlamydia pneumoniae antibody is produced from the culture supernatant consequently formed.

Detailed Description Paragraph Right (86):
The anti-Chlamydia pneumoniae can be detected and measured by using the fused protein of this invention as an antigen as follows.

Detailed Description Paragraph Right (87):
The polypeptide formed of the amino acid sequence of SEQ ID No: 15 is used as a fused protein. It is fixed on a microtiter plate, made to add a PBS containing bovine serum albumin, and left standing overnight at 4.degree. C. to effect blocking. The PBS containing the bovine serum albumin is removed and the plate is washed twice with the PBS containing 0.02% (w/v) Tween 20. The blood serum from a patient is added to the wells and is left standing at room temperature for two hours. The well is washed three times with the PBS containing 0.02% (w/v) Tween 20 in the same manner as described above. In each of the wells, a peroxidase-labelled mouse anti-human IgG antibody is placed and left standing at room temperature for two hours. The culture solution in the well is washed three times with the PBS containing 0.02% (w/v) Tween 20 in the same manner as described above. In the well, an ABTS solution (produced by KPL Corp.) is placed and left standing at room temperature for 15 minutes to one hour to effect a reaction of coloration. The culture solution is then tested for absorbance at 405 nm by the use of a photometer for 96-well EIA plate.

Detailed Description Paragraph Right (88):
A DNA formed of a base sequence of SEQ ID No: 19 and a DNA formed of a base sequence of SEQ ID No: 20 were chemically synthesized with a DNA synthesizing device produced by Applied Biosystems Corp and were designated respectively as Primer 53F2 and Primer 53R2.

Detailed Description Paragraph Right (89):
The cells infected with the YK41 strain of Chlamydia pneumoniae or the L2 strain of Chlamydia trachomatis or the Bugd. 17-SL strain of Chlamydia psittaci were recovered by centrifugation. The cells plus 0.1 ml of a 50 mM tris-hydrochloride buffer (pH 8.3) containing 50 mM of KCl, 2.5 mM of MgCl.sub.2, 0.1 mg/ml of gelatin, 0.45% of Nonidet P40, 0.45% of Tween 20, and 0.1 mg/ml of proteinase K were kept warmed at 56.degree. C. for one hour and then heated at 95.degree. C. for 10 minutes to inactivate the proteinase K and obtain a sample containing the gene of relevant chlamydia.

Detailed Description Paragraph Right (92):
As a result, the sample obtained from the YK41 strain of Chlamydia pneumoniae was

found to form a visible band of DNA of a size of 360 bp corresponding to a region interposed between the base sequence of Primer 53F2 and a base sequence complementary to the base sequence of Primer 53R2 in all the base sequences of SEQ ID No: 3. The samples obtained from the other strains were not found to form any visible band of DNA.

Detailed Description Paragraph Right (93):
The antigenic polypeptide of this invention formed of a polypeptide A containing at least five continuous amino acid sequences in the polypeptides of SEQ ID No: 1 can be utilized as for the examination of an antibody of Chlamydia pneumoniae.

Detailed Description Paragraph Right (94):
The antigenic polypeptide of this invention the polypeptide A of which is a polypeptide arising from the loss of 1 to 250 amino acids from the polypeptides of SEQ ID No: 1 has an amino acid sequence of a small length and, therefore, is enabled to increase the number of antigenic peptides which can be fixed as on a carrier. Thus, it can be utilized for the production of a diagnostic agent of high sensitivity.

Detailed Description Paragraph Right (96):
The antigenic polypeptide of this invention the polypeptide A of which is a polypeptide having an amino acid or 2 to 1000 amino acid sequences ligated to at least five continuous amino acid sequences in the polypeptides of SEQ ID No: 1 can be fixed as to a carrier by making use of the amino acid or 2 to 1000 amino acid sequences and, therefore, does not easily yield to decline or loss of the antigenecity by fixation.

Detailed Description Paragraph Right (97):
The antigenic polypeptide of this invention the polypeptide A of which is a polypeptide formed of amino acid sequences of SEQ ID No: 1 possesses the whole of antigenic polypeptides specific to Chlamydia pneumoniae and, therefore, is highly suitable for the examination of antigens and for accurate diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (98):
The antigenic polypeptide of this invention the polypeptide A of which is a polypeptide formed of amino acid sequences of SEQ ID No: 2 or ID No: 5 possesses an antigenic part specific to Chlamydia pneumoniae and, therefore, is highly suitable for the examination of antigens and for accurate diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (99):
The DNA of this invention which is a DNA coding for any of the antigenic polypeptides mentioned above or a DNA complementary thereto can be utilized for the production of an antigenic polypeptide suitable for the examination of antigens of Chlamydia pneumoniae, the diagnosis of infections involving Chlamydia pneumoniae, and the like.

Detailed Description Paragraph Right (100):
The DNA of this invention the base sequence of which is a base sequence of SEQ ID No: 3 codes for the whole of the antigenic polypeptide specific to Chlamydia pneumoniae can be utilized for the production of an antigenic polypeptide suitable for the examination of antibodies specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (101):
The DNA of this invention the base sequence of which is a base sequence of SEQ ID No: 4 or ID No: 7 codes for the antigenic part specific to Chlamydia pneumoniae can be utilized for the production of an antigenic polypeptide suitable for the examination of antigens specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (102):
The recombinant vector of this invention containing any of the DNA's mentioned above can be utilized for the production of an antigenic polypeptide suitable for the examination of an antibody of Chlamydia pneumoniae and the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (103):
The recombinant vector of this invention which is a pCPN533a plasmid possessing a base

sequence of SEQ ID No: 10 is capable of expressing a polypeptide possessing an antigenic part specific to Chlamydia pneumoniae and, therefore, can be utilized for the production of an antigenic polypeptide highly suitable as for the examination of antibodies specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (104):
The transformant of this invention which contains any of the recombinant vectors mentioned above can be utilized for the production of an antigenic polypeptide suitable as for the examination of antibody specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (105):
The method of this invention for the production of an anti-Chlamydia pneumoniae antibody which is characterized by using any of the antigenic polypeptides mentioned above as an antigen can be utilized for the production of a diagnostic agent for infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (106):
The method of this invention for the detection and determination of an anti-Chlamydia pneumoniae antibody which is characterized by using any of the antigenic polypeptides mentioned above as an antigen can be utilized for the examination of antibodies of Chlamydia pneumoniae and the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (107):
Particularly when an antigenic polypeptide having an amino acid sequence of a small length is utilized, it manifests high sensitivity because it allows an increase in the number of antigenic polypeptides to be fixed as on a carrier.

Detailed Description Paragraph Right (109):
When an antigenic polypeptide adding other amino acid sequences is utilized for the diagnosis of infections involving Chlamydia pneumoniae, it fulfills the role ideally because it enables a polypeptide being used as an antigen to be fixed as on a carrier by making use of amino acids or 2 to 1000 amino acid sequences and only sparingly incurs decline or loss of the antigenicity due to the fixation.

Detailed Description Paragraph Right (110):
When an antigenic polypeptide formed of amino acid sequences of SEQ ID No: 1 is utilized for the examination of antibodies or the diagnosis of infections involving Chlamydia pneumoniae, it fulfills the examination or the diagnosis with perfect accuracy because a polypeptide being used as an antigen possesses the whole antigenic polypeptide specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (111):
When an antigenic polypeptide formed of amino acid sequences of SEQ ID No: 2 or ID No: 5 is utilized for the examination of antibodies or the diagnosis of infections involving Chlamydia pneumoniae, it fulfills the examination or the diagnosis with perfect accuracy because a polypeptide being used as an antigen possesses an antigenic part specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (112):
The reagent of this invention for the detection and determination of an anti-Chlamydia pneumoniae antibody which contains any of the antigenic polypeptides mentioned above as an antigen ideally fits the examination of antibodies of Chlamydia pneumoniae and the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (113):
Particularly, when an antigenic polypeptide having an amino acid sequence of a small length is utilized for the reagent, the reagent enjoys high sensitivity because it allows an increase in the number of antigenic polypeptides to be fixed as on a carrier.

Detailed Description Paragraph Right (115):
Further, when an antigenic polypeptide adding other amino acid sequences is utilized for the diagnosis of infections involving Chlamydia pneumoniae, it fulfills the role ideally because it enables a polypeptide being used as an antigen to be fixed as on a carrier by making use of amino acids or 2 to 1000 amino acid sequences and only

sparingly incurs decline or loss of the antigenicity due to the fixation.

Detailed Description Paragraph Right (116):
Then, when an antigenic polypeptide formed of amino acid sequences of SEQ ID No: 1 is utilized for the examination of antibodies or the diagnosis of infections involving Chlamydia pneumoniae, it fulfills the examination or the diagnosis with perfect accuracy because a polypeptide being used as an antigen possesses the whole antigenic polypeptide specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (117):
When an antigenic polypeptide formed of amino acid sequences of SEQ ID No: 2 or ID No: 5 is utilized for the examination of antibodies or the diagnosis of infections involving Chlamydia pneumoniae, it fulfills the examination or the diagnosis with perfect accuracy because a polypeptide being used as an antigen possesses an antigenic part specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (118):
The diagnostic agent of this invention which has any of the antigenic polypeptides mentioned above as an active component ideally fits the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (119):
Particularly, when an antigenic polypeptide having an amino acid sequence of a short length is adopted for the agent, the agent enjoys high sensitivity because it allows an increase in the number of antigenic polypeptides to be fixed as on a carrier.

Detailed Description Paragraph Right (121):
Further, when an antigenic polypeptide adding other amino acid sequences is utilized for the diagnosis of infections involving Chlamydia pneumoniae, it fulfills the role ideally because it enables a polypeptide being used as an antigen to be fixed as on a carrier by making use of amino acids or 2 to 1000 amino acid sequences and only sparingly incurs decline or loss of the antigenicity due to the fixation.

Detailed Description Paragraph Right (122):
Then, when an antigenic polypeptide formed of amino acid sequences of SEQ ID No: 1 is utilized for the examination of antibodies or the diagnosis of infections involving Chlamydia pneumoniae, it fulfills the examination or the diagnosis with perfect accuracy because a polypeptide being used as an antigen possesses the whole antigenic polypeptide specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (123):
When an antigenic polypeptide formed of amino acid sequences of SEQ ID No: 2 or ID No: 5 is utilized for the examination of antibodies or the diagnosis of infections involving Chlamydia pneumoniae, it fulfills the examination or the diagnosis with perfect accuracy because a polypeptide being used as an antigen possesses an antigenic part specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (124):
The fused protein of this invention which has ligated to a polypeptide of SEQ ID No: 14 either directly or through the medium of an amino acid sequence a polypeptide A containing at least five continuous amino acid sequences in the polypeptides of SEQ ID No: 1 can be utilized as for the examination of antibodies of Chlamydia pneumoniae.

Detailed Description Paragraph Right (125):
The fused protein of this invention the polypeptide A of which is a polypeptide arising from the loss of 1 to 250 amino acids from the polypeptides of SEQ ID No: 1 has an amino acid sequence of a small length and, therefore, is enabled to increase the number of antigenic peptides which can be fixed as on a carrier. Thus, it can be utilized for the production of a diagnostic agent of high sensitivity.

Detailed Description Paragraph Right (127):
The fused protein of this invention which is a polypeptide formed of amino acid sequences of SEQ ID No: 15 is highly suitable for the examination of antibodies and the diagnosis of infections involving Chlamydia pneumoniae because it possesses the whole of antigenic polypeptides specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (128):
The fused protein of this invention which is a polypeptide formed of amino acid sequences of SEQ ID No: 16 is highly suitable for the examination of antibodies and the diagnosis of infections involving Chlamydia pneumoniae because it possesses an antigenic part specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (129):
The DNA of this invention which is a DNA coding for any of the fused proteins mentioned above or a DNA complementary thereto can be utilized for the production of a fused protein suitable for the examination of antibodies of Chlamydia pneumoniae, the diagnosis of infections involving Chlamydia pneumoniae, and the like.

Detailed Description Paragraph Right (130):
The DNA of this invention the base sequences of which are base sequences of SEQ ID No: 17 can be utilized for the production of a fused protein suitable as for the examination of antibodies specific to Chlamydia pneumoniae because the fused protein coded for by this DNA possesses the whole of antigenic polypeptides specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (131):
The DNA of this invention the base sequences of which are base sequences of SEQ ID No: 18 can be utilized for the production of a fused protein suitable as for the examination of antibodies specific to Chlamydia pneumoniae because the fused protein coded for by this DNA possesses an antigenic part specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (132):
The recombinant vector of this invention which carries any of the DNA's mentioned above can be utilized for the production of a fused protein suitable for the examination of antibodies of Chlamydia pneumoniae and the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (133):
The recombinant vector of this invention which is a pCPN533T plasmid can be utilized for the production of a fused protein highly suitable as for the examination of antibodies specific to Chlamydia pneumoniae because it is capable of expressing a fused protein possessing an antigenic part specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (134):
The transformant of this invention which contains any of the recombinant vectors mentioned above can be utilized for the production of a fused protein suitable as for the examination of antibodies specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (135):
The method of this invention for the production of an anti-Chlamydia pneumoniae antibody which is characterized by using any of the fused proteins mentioned above as an antigen can be utilized for the production of a diagnostic agent for infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (136):
The method of this invention for the detection and determination of an anti-Chlamydia pneumoniae antibody which is characterized by using any of the fused proteins mentioned above as an antigen is suitable for the examination of antibodies of Chlamydia pneumoniae and the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (137):
Particularly, when a fused protein having an amino acid sequence of a short length is adopted for the method, the method enjoys high sensitivity because this fused protein allows an increase in the number of antigenic polypeptides to be fixed as on a carrier.

Detailed Description Paragraph Right (139):
A fused protein which is formed of amino acid sequences of SEQ ID No: 15 is highly suitable for the examination of antibodies and the diagnosis of infections involving Chlamydia pneumoniae because a fused protein being used as an antigen possesses the

whole of antigenic polypeptides specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (140):
A fused protein which is formed of amino acid sequences of SEQ ID No: 16 is highly suitable for the examination of antibodies and the diagnosis of infections involving Chlamydia pneumoniae because a fused protein being used as an antigen possesses an antigenic part specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (141):
The reagent of this invention which contains any of the fused proteins mentioned above as an antigen is suitable for the examination of antibodies of Chlamydia pneumoniae and the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (142):
Particularly, when a fused protein having an amino acid sequence of a small length is utilized for the reagent, the reagent enjoys high sensitivity because it allows an increase in the number of antigenic polypeptides to be fixed as on a carrier.

Detailed Description Paragraph Right (144):
A fused protein which is formed of amino acid sequences of SEQ ID No: 15 is highly suitable for the examination of antibodies and the diagnosis of infections involving Chlamydia pneumoniae because a fused protein being used as an antigen possesses the whole of antigenic polypeptides specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (145):
A fused protein which is formed of amino acid sequences of SEQ ID No: 16 is highly suitable for the examination of antibodies and the diagnosis of infections involving Chlamydia pneumoniae because a fused protein being used as an antigen possesses an antigenic part specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (146):
The diagnostic medicine of this invention having any of the fused proteins mentioned above as an active component thereof is suitable for the examination of antibodies of Chlamydia pneumoniae and the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (147):
Particularly, when a fused protein having an amino acid sequence of a small length is utilized for the agent, the agent enjoys high sensitivity because it allows an increase in the number of antigenic polypeptides to be fixed as on a carrier.

Detailed Description Paragraph Right (149):
A fused protein which is formed of amino acid sequences of SEQ ID No: 15 is highly suitable for the examination of antibodies and the diagnosis of infections involving Chlamydia pneumoniae because a fused protein being used as an antigen possesses the whole of antigenic polypeptides specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (150):
A fused protein which is formed of amino acid sequences of SEQ ID No: 16 is highly suitable for the examination of antibodies and the diagnosis of infections involving Chlamydia pneumoniae because a fused protein being used as an antigen possesses an antigenic part specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (151):
The probe and the primer of this invention are suitable for the detection and determination of a Chlamydia pneumoniae gene and the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (152):
Particularly, a probe and a primer which possesses base sequences of SEQ ID No: 19 or ID No: 20 can be utilized for accurate diagnosis of infections involving Chlamydia pneumoniae because they possess base sequences specific to Chlamydia pneumoniae.

Detailed Description Paragraph Right (153):
The method of this invention for the detection and determination of a Chlamydia pneumoniae gene by the use of any of the probes or primers mentioned above is suitable

for the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (154):
The reagent of this invention for the detection and determination of a Chlamydia pneumoniae which contains any of the probes or the primers mentioned above is ideally suitable for the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Right (155):
The diagnostic agent of this invention which has any of the probes or the primers mentioned above as an active component is ideally suitable for the diagnosis of infections involving Chlamydia pneumoniae.

Detailed Description Paragraph Left (2):
(B) Culture of Chlamydia pneumoniae YK41

Detailed Description Paragraph Left (3):
(C) Purification of Elementary Body of Chlamydia pneumoniae YK41

Detailed Description Paragraph Left (4):
(D) Preparation of Genome DNA of Chlamydia pneumoniae YK-41 Strain

Detailed Description Paragraph Left (6):
(F) Production of Chlamydia pneumoniae-Specific Monoclonal Antibody

Detailed Description Paragraph Left (14):
(I) Amplification of DNA Coding for Chlamydia pneumoniae Antigenic Polypeptide

Detailed Description Paragraph Left (15):
(J) Analysis for DNA Base Sequence

Detailed Description Paragraph Center (3):
Preparation of DNA coding for 53K Antigenic Polypeptide Specific to Chlamydia pneumoniae

Detailed Description Paragraph Center (5):
Preparation of Recombinant Vector Containing DNA Coding for Polypeptide Containing Part of Antigenic Polypeptide of Chlamydia pneumoniae, and Preparation of Transformant Carrying the Vector

Detailed Description Paragraph Center (7):
Acquisition of DNA Coding for the Entire 53 KDa Antigenic Polypeptide of Chlamydia pneumoniae

Detailed Description Paragraph Center (9):
Preparation of Recombinant Vector Containing DNA Coding for Entire 53 KDa Antigenic Polypeptide of Chlamydia pneumoniae and Preparation of Transformant Carrying the Vector

Detailed Description Paragraph Center (11):
Preparation of DNA Coding for 73K Antigenic Polypeptide of Chlamydia pneumoniae

Detailed Description Paragraph Center (13):
Production of Anti-Chlamydia pneumoniae Antibody Using Antigenic Polypeptide of Chlamydia pneumoniae as Antigen

Detailed Description Paragraph Center (15):
Detection and Determination of Anti-Chlamydia pneumoniae Antibody Using an Antigenic Polypeptide as an Antigen

Detailed Description Paragraph Center (17):
Production of Recombinant Vector Carrying DNA Coding for Fused Protein of Peptide Containing DHFR and Part of Antigenic Polypeptide of Chlamydia pneumoniae and Production of Transformant Containing the Recombinant Vector

Detailed Description Paragraph Center (19):

Recognition of Fused Protein of Polypeptide Containing DHFR and Part of 53 KDa Antigenic Polypeptide of Chlamydia pneumoniae

Detailed Description Paragraph Center (21):
Acquisition of DNA Coding for Entire 53 KDa Antigenic Polypeptide of Chlamydia pneumoniae

Detailed Description Paragraph Center (23):
Production of Recombinant Vector Carrying DNA Coding for Fused Protein of DHFR and Entire 53 KDa Antigenic Polypeptide of Chlamydia pneumoniae and Production of Transformant Containing the Recombinant Vector

Detailed Description Paragraph Center (25):
Production of Anti-Chlamydia pneumoniae Antibody by Use of Fused Protein as an Antigen

Detailed Description Paragraph Center (27):
Detection and Determination of Anti-Chlamydia pneumoniae Antibody by Using Fused Protein as Antigen

Detailed Description Paragraph Center (29):
Detection of Chlamydia pneumoniae Gene by PCR Method

Detailed Description Paragraph Table (2):

SEQUENCE LISTING - - - - (1) GENERAL INFORMATION: - - (iii) NUMBER OF SEQUENCES: 31 - - - - (2) INFORMATION FOR SEQ ID NO:1: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:488 amino ac - #ids (B) TYPE: amino acid (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: peptide - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1: - - Met Ser Ile Ser Ser Ser Ser Gly Pro Asp As - #n Gln Lys Asn Ile Met 1 5 - # 10 - # 15 - - Ser Gln Val Leu Thr Ser Thr Pro Gln Gly Va - #l Pro Gln Gln Asp Lys 20 - # 25 - # 30 - - Leu Ser Gly Asn Glu Thr Lys Gln Ile Gln Gl - #n Thr Arg Gln Gly Lys 35 - # 40 - # 45 - - Asn Thr Glu Met Glu Ser Asp Ala Thr Ile Al - #a Gly Ala Ser Gly Lys 50 - # 55 - # 60 - - Asp Lys Thr Ser Ser Thr Thr Lys Thr Glu Th - #r Ala Pro Gln Gln Gly 65 - # 70 - # 75 - # 80 - - Val Ala Ala Gly Lys Glu Ser Ser Glu Ser Gl - #n Lys Ala Gly Ala Asp 85 - # 90 - # 95 - - Thr Gly Val Ser Gly Ala Ala Ala Thr Thr Al - #a Ser Asn Thr Ala Thr 100 - # 105 - # 110 - - Lys Ile Ala Met Gln Thr Ser Ile Glu Glu Al - #a Ser Lys Ser Met Glu 115 - # 120 - # 125 - - Ser Thr Leu Glu Ser Leu Gln Ser Leu Ser Al - #a Ala Gln Met Lys Glu 130 - # 135 - # 140 - - Val Glu Ala Val Val Val Ala Ala Leu Ser Gl - #y Lys Ser Ser Gly Ser 145 1 - #50 1 - #55 1 - #60 - - Ala Lys Leu Glu Thr Pro Glu Leu Pro Lys Pr - #o Gly Val Thr Pro Arg 165 - # 170 - # 175 - - Ser Glu Val Ile Glu Ile Gly Leu Ala Leu Al - #a Lys Ala Ile Gln Thr 180 - # 185 - # 190 - - Leu Gly Glu Ala Thr Lys Ser Ala Leu Ser As - #n Tyr Ala Ser Thr Gln 195 - # 200 - # 205 - - Ala Gln Ala Asp Gln Thr Asn Lys Leu Gly Le - #u Glu Lys Gln Ala Ile 210 - # 215 - # 220 - - Lys Ile Asp Lys Glu Arg Glu Glu Tyr Gln Gl - #u Met Lys Ala Ala Glu 225 2 - #30 2 - #35 2 - #40 - - Gln Lys Ser Lys Asp Leu Glu Gly Thr Met As - #p Thr Val Asn Thr Val 245 - # 250 - # 255 - - Met Ile Ala Val Ser Val Ala Ile Thr Val Il - #e Ser Ile Val Ala Ala 260 - # 265 - # 270 - - Ile Phe Thr Cys Gly Ala Gly Leu Ala Gly Le - #u Ala Ala Gly Ala Ala 275 - # 280 - # 285 - - Val Gly Ala Ala Ala Ala Gly Gly Ala Ala Gl - #y Ala Ala Ala Ala Thr 290 - # 295 - # 300 - - Thr Val Ala Thr Gln Ile Thr Val Gln Ala Va - #l Val Gln Ala Val Lys 305 3 - #10 3 - #15 3 - #20 - - Gln Ala Val Ile Thr Ala Val Arg Gln Ala Il - #e Thr Ala Ala Ile Lys 325 - # 330 - # 335 - - Ala Ala Val Lys Ser Gly Ile Lys Ala Phe Il - #e Lys Thr Leu Val Lys 340 - # 345 - # 350 - - Ala Ile Ala Lys Ala Ile Ser Lys Gly Ile Se - #r Lys Val Phe Ala Lys 355 - # 360 - # 365 - - Gly Thr Gln Met Ile Ala Lys Asn Phe Pro Ly - #s Leu Ser Lys Val Ile 370 - # 375 - # 380 - - Ser Ser Leu Thr Ser Lys Trp Val Thr Val Gl - #y Val Gly Val Val Val 385 3 - #90 3 - #95 4 - #00 - - Ala Ala Pro Ala Leu Gly Lys Gly Ile Met Gl - #n Met Gln Leu Ser Glu 405 - # 410 - # 415 - - Met Gln Gln Asn Val Ala Gln Phe Gln Lys Gl - #u Val Gly Lys Leu Gln 420 - # 425 - # 430 - - Ala Ala Ala Asp Met Ile Ser Met Phe Thr Gl - #n Phe Trp Gln Gln Ala 435 - # 440 - # 445 - - Ser Lys Ile Ala Ser Lys Gln Thr Gly Glu Se - #r Asn Glu Met Thr Gln 450 - # 455 - # 460 - - Lys Ala Thr Lys Leu Gly Ala Gln Ile Leu Ly - #s Ala Tyr Ala Ala Ile 465 4 - #70 4 - #75 4 - #80 - - Ser Gly Ala Ile Ala Gly Ala Ala 485 - - - - (2) INFORMATION FOR SEQ ID NO:2: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:271 amino ac - #ids (B) TYPE: amino acid (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: peptide - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:2: - - Met Ser Ile Ser Ser Ser Ser

Gly Pro Asp As - #n Gln Lys Asn Ile Met 1 5 - # 10 - # 15 - - Ser Gln Val Leu Thr Ser
Thr Pro Gln Gly Va - #l Pro Gln Gln Asp Lys 20 - # 25 - # 30 - - Leu Ser Gly Asn Glu
Thr Lys Gln Ile Gln Gl - #n Thr Arg Gln Gly Lys 35 - # 40 - # 45 - - Asn Thr Glu Met
Glu Ser Asp Ala Thr Ile Al - #a Gly Ala Ser Gly Lys 50 - # 55 - # 60 - - Asp Lys Thr
Ser Ser Thr Thr Lys Thr Glu Th - #r Ala Pro Gln Gln Gly 65 - # 70 - # 75 - # 80 - -
Val Ala Ala Gly Lys Glu Ser Ser Glu Ser Gl - #n Lys Ala Gly Ala Asp 85 - # 90 - # 95 -
- Thr Gly Val Ser Gly Ala Ala Ala Thr Thr Al - #a Ser Asn Thr Ala Thr 100 - # 105 - #
110 - - Lys Ile Ala Met Gln Thr Ser Ile Glu Glu Al - #a Ser Lys Ser Met Glu 115 - #
120 - # 125 - - Ser Thr Leu Glu Ser Leu Gln Ser Leu Ser Al - #a Ala Gln Met Lys Glu
130 - # 135 - # 140 - - Val Glu Ala Val Val Val Ala Ala Leu Ser Gl - #y Lys Ser Ser
Gly Ser 145 1 - #50 1 - #55 1 - #60 - - Ala Lys Leu Glu Thr Pro Glu Leu Pro Lys Pr -
#o Gly Val Thr Pro Arg 165 - # 170 - # 175 - - Ser Glu Val Ile Glu Ile Gly Leu Ala Leu
Al - #a Lys Ala Ile Gln Thr 180 - # 185 - # 190 - - Leu Gly Glu Ala Thr Lys Ser Ala
Leu Ser As - #n Tyr Ala Ser Thr Gln 195 - # 200 - # 205 - - Ala Gln Ala Asp Gln Thr
Asn Lys Leu Gly Le - #u Glu Lys Gln Ala Ile 210 - # 215 - # 220 - - Lys Ile Asp Lys
Glu Arg Glu Glu Tyr Gln Gl - #u Met Lys Ala Ala Glu 225 2 - #30 2 - #35 2 - #40 - -
Gln Lys Ser Lys Asp Leu Glu Gly Thr Met As - #p Thr Val Asn Thr Val 245 - # 250 - #
255 - - Met Ile Ala Lys Gly Phe Glu Leu Pro Trp Gl - #y Pro Leu Ile Asn 260 - # 265 -
270 - - - - (2) INFORMATION FOR SEQ ID NO:3: - - (i) SEQUENCE CHARACTERISTICS: (A)
LENGTH:1464 base pa - #irs (B) TYPE: nucleic acid (C) STRANDEDNESS: double (D)
TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi)
SEQUENCE DESCRIPTION: SEQ ID NO:3: - - ATG TCT ATT TCA TCT TCT TCA GGA CCT GAC AA - #T
CAA AAA AAT ATC ATG 48 Met Ser Ile Ser Ser Ser Ser Gly Pro Asp As - #n Gln Lys Asn Ile
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GAT AAG 96 Ser Gln Val Leu Thr Ser Thr Pro Gln Gly Va - #l Pro Gln Gln Asp Lys 20 - #
25 - # 30 - - CTG TCT GGC AAC GAA ACG AAG CAA ATA CAG CA - #A ACA CGT CAG GGT AAA 144
Leu Ser Gly Asn Glu Thr Lys Gln Ile Gln Gl - #n Thr Arg Gln Gly Lys 35 - # 40 - # 45 -
- AAC ACT GAG ATG GAA AGC GAT GCC ACT ATT GC - #T GGT GCT TCT GGA AAA 192 Asn Thr Glu
Met Glu Ser Asp Ala Thr Ile Al - #a Gly Ala Ser Gly Lys 50 - # 55 - # 60 - - GAC AAA
ACT TCC TCG ACT ACA AAA ACA GAA AC - #A GCT CCA CAA CAG GGA 240 Asp Lys Thr Ser Ser
Thr Thr Lys Thr Glu Th - #r Ala Pro Gln Gln Gly 65 - # 70 - # 75 - # 80 - - GTT GCT
GCT GGG AAA GAA TCC TCA GAA AGT CA - #A AAG GCA GGT GCT GAT 288 Val Ala Ala Gly Lys
Glu Ser Ser Glu Ser Gl - #n Lys Ala Gly Ala Asp 85 - # 90 - # 95 - - ACT GGA GTA TCA
GGA GCG GCT GCT ACT ACA GC - #A TCA AAT ACT GCA ACA 336 Thr Gly Val Ser Gly Ala Ala
Ala Thr Thr Al - #a Ser Asn Thr Ala Thr 100 - # 105 - # 110 - - AAA ATT GCT ATG CAG
ACC TCT ATT GAA GAG GC - #G AGC AAA AGT ATG GAG 384 Lys Ile Ala Met Gln Thr Ser Ile
Glu Glu Al - #a Ser Lys Ser Met Glu 115 - # 120 - # 125 - - TCT ACC TTA GAG TCA CTT
CAA AGC CTC AGT GC - #C GCG CAA ATG AAA GAA 432 Ser Thr Leu Glu Ser Leu Gln Ser Leu
Ser Al - #a Ala Gln Met Lys Glu 130 - # 135 - # 140 - - GTC GAA GCG GTT GTT GTT GCT
GCC CTC TCA GG - #G AAA AGT TCG GGT TCC 480 Val Glu Ala Val Val Val Ala Ala Leu Ser Gl
- #y Lys Ser Ser Gly Ser 145 1 - #50 1 - #55 1 - #60 - - GCA AAA TTG GAA ACA CCT GAG
CTC CCC AAG CC - #C GGG GTG ACA CCA AGA 528 Ala Lys Leu Glu Thr Pro Glu Leu Pro Lys Pr
- #o Gly Val Thr Pro Arg 165 - # 170 - # 175 - - TCA GAG GTT ATC GAA ATC GGA CTC GCG
CTT GC - #T AAA GCA ATT CAG ACA 576 Ser Glu Val Ile Glu Ile Gly Leu Ala Leu Al - #a
Lys Ala Ile Gln Thr 180 - # 185 - # 190 - - TTG GGA GAA GCC ACA AAA TCT GCC TTA TCT AA
- #C TAT GCA AGT ACA CAA 624 Leu Gly Glu Ala Thr Lys Ser Ala Leu Ser As - #n Tyr Ala
Ser Thr Gln 195 - # 200 - # 205 - - GCA CAA GCA GAC CAA ACA AAT AAA CTA GGT CT - #A
GAA AAG CAA GCG ATA 672 Ala Gln Ala Asp Gln Thr Asn Lys Leu Gly Le - #u Glu Lys Gln
Ala Ile 210 - # 215 - # 220 - - AAA ATC GAT AAA GAA CGA GAA GAA TAC CAA GA - #G ATG
AAG GCT GCC GAA 720 Lys Ile Asp Lys Glu Arg Glu Glu Tyr Gln Gl - #u Met Lys Ala Ala
Glu 225 2 - #30 2 - #35 2 - #40 - - CAG AAG TCT AAA GAT CTC GAA GGA ACA ATG GA - #T
ACT GTC AAT ACT GTG 768 Gln Lys Ser Lys Asp Leu Glu Gly Thr Met As - #p Thr Val Asn
Thr Val 245 - # 250 - # 255 - - ATG ATC GCG GTT TCT GTT GCC ATT ACA GTT AT - #T TCT
ATT GTT GCT GCT 816 Met Ile Ala Val Ser Val Ala Ile Thr Val Il - #e Ser Ile Val Ala
Ala 260 - # 265 - # 270 - - ATT TTT ACA TGC GGA GCT GGA CTC GCT GGA CT - #C GCT GCG
GGA GCT GCT 864 Ile Phe Thr Cys Gly Ala Gly Leu Ala Gly Le - #u Ala Ala Gly Ala Ala
275 - # 280 - # 285 - - GTA GGT GCA GCG GCA GCT GGA GGT GCA GCA GG - #A GCT GCT GCC
GCA ACC 912 Val Gly Ala Ala Ala Ala Gly Gly Ala Ala Gl - #y Ala Ala Ala Ala Thr 290 -
295 - # 300 - - ACG GTA GCA ACA CAA ATT ACA GTT CAA GCT GT - #T GTC CAA GCG GTG AAA
960 Thr Val Ala Thr Gln Ile Thr Val Gln Ala Va - #l Val Gln Ala Val Lys 305 3 - #10 3
- #15 3 - #20 - - CAA GCT GTT ATC ACA GCT GTC AGA CAA GCG AT - #C ACC GCG GCT ATA AAA
1008 Gln Ala Val Ile Thr Ala Val Arg Gln Ala Il - #e Thr Ala Ala Ile Lys 325 - # 330 -
335 - - GCG GCT GTC AAA TCT GGA ATA AAA GCA TTT AT - #C AAA ACT TTA GTC AAA 1056 Ala
Ala Val Lys Ser Gly Ile Lys Ala Phe Il - #e Lys Thr Leu Val Lys 340 - # 345 - # 350 -
- GCG ATT GCC AAA GCC ATT TCT AAA GGA ATC TC - #T AAG GTT TTC GCT AAG 1104 Ala Ile Ala

Lys Ala Ile Ser Lys Gly Ile Se - #r Lys Val Phe Ala Lys 355 - # 360 - # 365 - - GGA
ACT CAA ATG ATT GCG AAG AAC TTC CCC AA - #G CTC TCG AAA GTC ATC 1152 Gly Thr Gln Met
Ile Ala Lys Asn Phe Pro Ly - #s Leu Ser Lys Val Ile 370 - # 375 - # 380 - - TCG TCT
CTT ACC AGT AAA TGG GTC ACG GTT GG - #G GTT GGG GTT GTA GTT 1200 Ser Ser Leu Thr Ser
Lys Trp Val Thr Val Gl - #y Val Gly Val Val Val 385 3 - #90 3 - #95 4 - #00 - - GCG
GCG CCT GCT CTC GGT AAA GGG ATT ATG CA - #A ATG CAG CTC TCG GAG 1248 Ala Ala Pro Ala
Leu Gly Lys Gly Ile Met Gl - #n Met Gln Leu Ser Glu 405 - # 410 - # 415 - - ATG CAA
CAA AAC GTC GCT CAA TTT CAG AAA GA - #A GTC GGA AAA CTG CAG 1296 Met Gln Gln Asn Val
Ala Gln Phe Gln Lys Gl - #u Val Gly Lys Leu Gln 420 - # 425 - # 430 - - GCT GCG GCT
GAT ATG ATT TCT ATG TTC ACT CA - #A TTT TGG CAA CAG GCA 1344 Ala Ala Ala Asp Met Ile
Ser Met Phe Thr Gl - #n Phe Trp Gln Gln Ala 435 - # 440 - # 445 - - AGT AAA ATT GCC
TCA AAA CAA ACA GGC GAG TC - #T AAT GAA ATG ACT CAA 1392 Ser Lys Ile Ala Ser Lys Gln
Thr Gly Glu Se - #r Asn Glu Met Thr Gln

Detailed Description Paragraph Table (3):
450 - # 455 - # 460 - - AAA GCT ACC AAG CTG GGC GCT CAA ATC CTT AA - #A GCG TAT GCC
GCA ATC 1440 Lys Ala Thr Lys Leu Gly Ala Gln Ile Leu Ly - #s Ala Tyr Ala Ala Ile 465 4
- #70 4 - #75 4 - #80 - - AGC GGA GCC ATC GCT GGC GCA GCA - # - # 1464 Ser Gly Ala Ile
Ala Gly Ala Ala 485 - - - - (2) INFORMATION FOR SEQ ID NO:4: - - (i) SEQUENCE
CHARACTERISTICS: (A) LENGTH:813 (B) TYPE: nucleic acid (C) STRANDEDNESS: double (D)
TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi)
SEQUENCE DESCRIPTION: SEQ ID NO:4: - - ATG TCT ATT TCA TCT TCT TCA GGA CCT GAC AA - #T
CAA AAA AAT ATC ATG 48 Met Ser Ile Ser Ser Ser Ser Gly Pro Asp As - #n Gln Lys Asn Ile
Met 1 5 - # 10 - # 15 - - TCT CAA GTT CTG ACA TCG ACA CCC CAG GGC GT - #G CCC CAA CAA
GAT AAG 96 Ser Gln Val Leu Thr Ser Thr Pro Gln Gly Va - #l Pro Gln Gln Asp Lys 20 - #
25 - # 30 - - CTG TCT GGC AAC GAA ACG AAG CAA ATA CAG CA - #A ACA CGT CAG GGT AAA 144
Leu Ser Gly Asn Glu Thr Lys Gln Ile Gln Gl - #n Thr Arg Gln Gly Lys 35 - # 40 - # 45 -
- AAC ACT GAG ATG GAA AGC GAT GCC ACT ATT GC - #T GGT GCT TCT GGA AAA 192 Asn Thr Glu
Met Glu Ser Asp Ala Thr Ile Al - #a Gly Ala Ser Gly Lys 50 - # 55 - # 60 - - GAC AAA
ACT TCC TCG ACT ACA AAA ACA GAA AC - #A GCT CCA CAA CAG GGA 240 Asp Lys Thr Ser Ser
Thr Thr Lys Thr Glu Th - #r Ala Pro Gln Gln Gly 65 - # 70 - # 75 - # 80 - - GTT GCT
GCT GGG AAA GAA TCC TCA GAA AGT CA - #A AAG GCA GGT GCT GAT 288 Val Ala Ala Gly Lys
Glu Ser Ser Glu Ser Gl - #n Lys Ala Gly Ala Asp 85 - # 90 - # 95 - - ACT GGA GTA TCA
GGA GCG GCT GCT ACT ACA GC - #A TCA AAT ACT GCA ACA 336 Thr Gly Val Ser Gly Ala Ala
Ala Thr Thr Al - #a Ser Asn Thr Ala Thr 100 - # 105 - # 110 - - AAA ATT GCT ATG CAG
ACC TCT ATT GAA GAG GC - #G AGC AAA AGT ATG GAG 384 Lys Ile Ala Met Gln Thr Ser Ile
Glu Glu Al - #a Ser Lys Ser Met Glu 115 - # 120 - # 125 - - TCT ACC TTA GAG TCA CTT
CAA AGC CTC AGT GC - #C GCG CAA ATG AAA GAA 432 Ser Thr Leu Glu Ser Leu Gln Ser Leu
Ser Al - #a Ala Gln Met Lys Glu 130 - # 135 - # 140 - - GTC GAA GCG GTT GTT GTT GCT
GCC CTC TCA GG - #G AAA AGT TCG GGT TCC 480 Val Glu Ala Val Val Val Ala Ala Leu Ser Gl
- #y Lys Ser Ser Gly Ser 145 1 - #50 1 - #55 1 - #60 - - GCA AAA TTG GAA ACA CCT GAG
CTC CCC AAG CC - #C GGG GTG ACA CCA AGA 528 Ala Lys Leu Glu Thr Pro Glu Leu Pro Lys Pr
- #o Gly Val Thr Pro Arg 165 - # 170 - # 175 - - TCA GAG GTT ATC GAA ATC GGA CTC GCG
CTT GC - #T AAA GCA ATT CAG ACA 576 Ser Glu Val Ile Glu Ile Gly Leu Ala Leu Al - #a
Lys Ala Ile Gln Thr 180 - # 185 - # 190 - - TTG GGA GAA GCC ACA AAA TCT GCC TTA TCT AA
- #C TAT GCA AGT ACA CAA 624 Leu Gly Glu Ala Thr Lys Ser Ala Leu Ser As - #n Tyr Ala
Ser Thr Gln 195 - # 200 - # 205 - - GCA CAA GCA GAC CAA ACA AAT AAA CTA GGT CT - #A
GAA AAG CAA GCG ATA 672 Ala Gln Ala Asp Gln Thr Asn Lys Leu Gly Le - #u Glu Lys Gln
Ala Ile 210 - # 215 - # 220 - - AAA ATC GAT AAA GAA CGA GAA GAA TAC CAA GA - #G ATG
AAG GCT GCC GAA 720 Lys Ile Asp Lys Glu Arg Glu Glu Tyr Gln Gl - #u Met Lys Ala Ala
Glu 225 2 - #30 2 - #35 2 - #40 - - CAG AAG TCT AAA GAT CTC GAA GGA ACA ATG GA - #T
ACT GTC AAT ACT GTG 768 Gln Lys Ser Lys Asp Leu Glu Gly Thr Met As - #p Thr Val Asn
Thr Val 245 - # 250 - # 255 - - ATG ATC GCG AAG GGG TTC GAA TTG CCA TGG GG - #G CCC
TTA ATT AAT 81 - #3 Met Ile Ala Lys Gly Phe Glu Leu Pro Trp Gl - #y Pro Leu Ile Asn
260 - # 265 - # 270 - - - - (2) INFORMATION FOR SEQ ID NO:5: - - (i) SEQUENCE
CHARACTERISTICS: (A) LENGTH:259 amino ac - #ids (B) TYPE: amino acid (D) TOPOLOGY:
linear - - (ii) MOLECULE TYPE: peptide - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:5: - -
Met Ser Ile Ser Ser Ser Ser Gly Pro Asp As - #n Gln Lys Asn Ile Met 1 5 - # 10 - # 15
- - Ser Gln Val Leu Thr Ser Thr Pro Gln Gly Va - #l Pro Gln Gln Asp Lys 20 - # 25 - #
30 - - Leu Ser Gly Asn Glu Thr Lys Gln Ile Gln Gl - #n Thr Arg Gln Gly Lys 35 - # 40 -
45 - - Asn Thr Glu Met Glu Ser Asp Ala Thr Ile Al - #a Gly Ala Ser Gly Lys 50 - # 55
- # 60 - - Asp Lys Thr Ser Ser Thr Thr Lys Thr Glu Th - #r Ala Pro Gln Gln Gly 65 - #
70 - # 75 - # 80 - - Val Ala Ala Gly Lys Glu Ser Ser Glu Ser Gl - #n Lys Ala Gly Ala
Asp 85 - # 90 - # 95 - - Thr Gly Val Ser Gly Ala Ala Ala Thr Thr Al - #a Ser Asn Thr
Ala Thr 100 - # 105 - # 110 - - Lys Ile Ala Met Gln Thr Ser Ile Glu Glu Al - #a Ser

Lys Ser Met Glu 115 - # 120 - # 125 - - Ser Thr Leu Glu Ser Leu Gln Ser Leu Ser Al - #a Ala Gln Met Lys Glu 130 - # 135 - # 140 - - Val Glu Ala Val Val Val Ala Ala Leu Ser Gl - #y Lys Ser Ser Gly Ser 145 1 - #50 1 - #55 1 - #60 - - Ala Lys Leu Glu Thr Pro Glu Leu Pro Lys Pr - #o Gly Val Thr Pro Arg 165 - # 170 - # 175 - - Ser Glu Val Ile Glu Ile Gly Leu Ala Leu Al - #a Lys Ala Ile Gln Thr 180 - # 185 - # 190 - - Leu Gly Glu Ala Thr Lys Ser Ala Leu Ser As - #n Tyr Ala Ser Thr Gln 195 - # 200 - # 205 - - Ala Gln Ala Asp Gln Thr Asn Lys Leu Gly Le - #u Glu Lys Gln Ala Ile 210 - # 215 - # 220 - - Lys Ile Asp Lys Glu Arg Glu Glu Tyr Gln Gl - #u Met Lys Ala Ala Glu 225 2 - #30 2 - #35 2 - #40 - - Gln Lys Ser Lys Asp Leu Glu Gly Thr Met As - #p Thr Val Asn Thr Val 245 - # 250 - # 255 - - Met Ile Ala - - - - (2) INFORMATION FOR SEQ ID NO:6: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:571 amino ac - #ids (B) TYPE: amino acid (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: peptide - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:6: - - Met Pro Lys Gln Ala Glu Tyr Thr Trp Gly Se - #r Lys Lys Ile Leu Asp 1 5 - # 10 - # 15 - - Asn Ile Glu Cys Leu Thr Glu Asp Val Ala Gl - #u Phe Lys Asp Leu Leu 20 - # 25 - # 30 - - Tyr Thr Ala His Arg Ile Thr Ser Ser Glu Gl - #u Glu Ser Asp Asn Glu 35 - # 40 - # 45 - - Ile Gln Pro Gly Ala Ile Leu Lys Gly Thr Va - #l Val Asp Ile Asn Lys 50 - # 55 - # 60 - - Asp Phe Val Val Val Asp Val Gly Leu Lys Se - #r Glu Gly Val Ile Pro 65 - # 70 - # 75 - # 80 - - Met Ser Glu Phe Ile Asp Ser Ser Glu Gly Le - #u Val Leu Gly Ala Glu 85 - # 90 - # 95 - - Val Glu Val Tyr Leu Asp Gln Ala Glu Asp Gl - #u Glu Gly Lys Val Val 100 - # 105 - # 110 - - Leu Ser Arg Glu Lys Ala Thr Arg Gln Arg Gl - #n Trp Glu Tyr Ile Leu 115 - # 120 - # 125 - - Ala His Cys Glu Glu Gly Ser Ile Val Lys Gl - #y Gln Ile Thr Arg Lys 130 - # 135 - # 140 - - Val Lys Gly Gly Leu Ile Val Asp Ile Gly Me - #t Glu Ala Phe Leu Pro 145 1 - #50 1 - #55 1 - #60 - - Gly Ser Gln Ile Asp Asn Lys Lys Ile Lys As - #n Leu Asp Asp Tyr Val 165 - # 170 - # 175 - - Gly Lys Val Cys Glu Phe Lys Ile Leu Lys Il - #e Asn Val Glu Arg Arg 180 - # 185 - # 190 - - Asn Ile Val Val Ser Arg Arg Glu Leu Leu Gl - #u Ala Glu Arg Ile Ser 195 - # 200 - # 205 - - Lys Lys Ala Glu Leu Ile Glu Gln Ile Ser Il - #e Gly Glu Tyr Arg Lys 210 - # 215 - # 220 - - Gly Val Val Lys Asn Ile Thr Asp Phe Gly Va - #l Phe Leu Asp Leu Asp 225 2 - #30 2 - #35 2 - #40 - - Gly Ile Asp Gly Leu Leu His Ile Thr Asp Me - #t Thr Trp Lys Arg Ile 245 - # 250 - # 255 - - Arg His Pro Ser Glu Met Val Glu Leu Asn Gl - #n Glu Leu Glu Val Ile 260 - # 265 - # 270 - - Ile Leu Ser Val Asp Lys Glu Lys Gly Arg Va - #l Ala Leu Gly Leu Lys 275 - # 280 - # 285 - - Gln Lys Glu His Asn Pro Trp Glu Asp Ile Gl - #u Lys Lys Tyr Pro Pro 290 - # 295 - # 300 - - Gly Lys Arg Val Leu Gly Lys Ile Val Lys Le - #u Leu Pro Tyr Gly Ala 305 3 - #10 3 - #15 3 - #20 - - Phe Ile Glu Ile Glu Glu Gly Ile Glu Gly Le - #u Ile His Ile Ser Glu 325 - # 330 - # 335 - - Met Ser Trp Val Lys Asn Ile Val Asp Pro Se - #r Glu Val Val Asn Lys 340 - # 345 - # 350 - - Gly Asp Glu Val Glu Ala Ile Val Leu Ser Il - #e Gln Lys Asp Glu Gly 355 - # 360 - # 365 - - Lys Ile Ser Leu Gly Leu Lys Gln Thr Glu Ar - #g Asn Pro Trp Asp Asn 370 - # 375 - # 380 - - Ile Glu Glu Lys Tyr Pro Ile Gly Leu His Va - #l Asn Ala Glu Ile Lys 380 3 - #85 3 - #90 3 - #95 - - Asn Leu Thr Asn Tyr Gly Ala Phe Val Glu Le - #u Glu Pro Gly Ile Glu 400 - # 405 - # 410 - - Gly Leu Ile His Ile Ser Asp Met Ser Trp Il - #e Lys Lys Val Ser His 415 - # 420 - # 425 - - Pro Ser Glu Leu Phe Lys Lys Gly Asn Ser Va - #l Glu Ala Val Ile Leu 430 - # 435 - # 440 - - Ser Val Asp Lys Glu Ser Lys Lys Ile Thr Le - #u Gly Val Lys Gln Leu 445 - # 450 - # 455 - - Ser Ser Asn Pro Trp Asn Glu Ile Glu Ala Me - #t Phe Pro Ala Gly Thr 460 4 - #65 4 - #70 4 - #75 - - Val Ile Ser Gly Val Val Thr Lys Ile Thr Al - #a Phe Gly Ala Phe Val 480 - # 485 - # 490 - - Glu Leu Gln Asn Gly Ile Glu Gly Leu Ile Hi - #s Val Ser Glu Leu Ser 495 - # 500 - # 505 - - Asp Lys Pro Phe Ala Lys Ile Glu Asp Ile Il - #e Ser Ile Gly Glu Asn 510 - # 515 - # 520 - - Val Ser Ala Lys Val Ile Lys Leu Asp Pro As - #p His Lys Lys Val Ser 525 - # 530 - # 535 - - Leu Ser Val Lys Glu Tyr Leu Ala Asp Asn Al - #a Tyr Asp Gln Asp Ser 540 5 - #45 5 - #50 5 - #60 - - Arg Thr Glu Leu Asp Phe Lys Asp Ser Gln Gl - #y 565 - # 570 - - - - (2) INFORMATION FOR SEQ ID NO:7: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:777 base pai - #rs (B) TYPE: nucleic acid (C) STRANDEDNESS: double (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE:Genomic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:7: - - ATGTCTATTT CATCTTCTTC AGGACCTGAC AATCAAAAAA ATATCATGTC TC - #AAGTTCTG 60 - - ACATCGACAC CCCAGGGCGT GCCCCAACAA GATAAGCTGT CTGGCAACGA AA - #CGAAGCAA 120 - - ATACAGCAAA CACGTCAGGG TAAAAACACT GAGATGGAAA GCGATGCCAC TA - #TTGCTGGT 180 - - GCTTCTGGAA AAGACAAAAC TTCCTCGACT ACAAAAACAG AAACAGCTCC AC -

Detailed Description Paragraph Table (4):

#AACAGGGA 240 - - GTTGCTGCTG GGAAAGAATC CTCAGAAAGT CAAAAGGCAG GTGCTGATAC TG - #GAGTATCA 300 - - GGAGCGGCTG CTACTACAGC ATCAAATACT GCAACAAAAA TTGCTATGCA GA - #CCTCTATT 360 - - GAAGAGGCGA GCAAAAGTAT GGAGTCTACC TTAGAGTCAC TTCAAAGCCT CA - #GTGCCGCG 420 - - CAAATGAAAG AAGTCGAAGC GGTTGTTGTT GCTGCCCTCT CAGGGAAAAG TT -

#CGGGTTCC 480 - - GCAAAATTGG AAACACCTGA GCTCCCCAAG CCCGGGGTGA CACCAAGATC AG -
#AGGTTATC 540 - - GAAATCGGAC TCGCGCTTGC TAAAGCAATT CAGACATTGG GAGAAGCCAC AA -
#AATCTGCC 600 - - TTATCTAACT ATGCAAGTAC ACAAGCACAA GCAGACCAAA CAAATAAACT AG -
#GTCTAGAA 660 - - AAGCAAGCGA TAAAAATCGA TAAAGAACGA GAAGAATACC AAGAGATGAA GG -
#CTGCCGAA 720 - - CAGAAGTCTA AAGATCTCGA AGGAACAATG GATACTGTCA ATACTGTGAT GA - #TCGCG
777 - - - - (2) INFORMATION FOR SEQ ID NO:8: - - (i) SEQUENCE CHARACTERISTICS: (A)
LENGTH:1712 base pa - #irs (B) TYPE: nucleic acid (C) STRANDEDNESS: double (D)
TOPOLOGY: linear - - (ii) MOLECULE TYPE:Genomic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ
ID NO:8: - - ATGCCAAAAC AAGCTGAATA TACTTGGGGA TCTAAAAAAA TTCTGGACAA TA - #TAGAATGC 60
- - CTCACAGAAG ACGTTGCCGA ATTTAAAGAT TTGCTTTATA CGGCACACAG AA - #TTACTTCG 120 - -
AGCGAAGAAG AATCTGATAA CGAAATACAG CCTGGCGCCA TCCTAAAAGG TA - #CCGTAGTT 180 - -
GATATTAATA AAGACTTTGT CGTAGTTGAT GTTGGTCTGA AGTCTGAGGG AG - #TGATCCCT 240 - -
ATGTCAGAGT TCATAGACTC TTCAGAAGGT TTAGTGCTTG GAGCTGAAGT AG - #AAGTCTAT 300 - -
CTCGACCAAG CCGAAGACGA AGAGGGCAAA GTTGTCCTTT CTAGAGAAAA AG - #CCACACGA 360 - -
CAACGTCAAT GGGAATACAT CTTAGCTCAT TGTGAAGAAG GTTCTATTGT TA - #AAGGTCAA 420 - -
ATTACACGTA AAGTCAAAGG CGGCCTTATT GTAGATATTG GAATGGAAGC CT - #TCCTACCT 480 - -
GGATCACAAA TTGACAACAA GAAAATCAAA AATTTAGATG ATTATGTCGG AA - #AAGTTTGT 540 - -
GAATTCAAAA TTTTAAAAAT TAACGTTGAA CGTCGCAATA TTGTTGTCTC AA - #GAAGAGAA 600 - -
CTCTTAGAAG CTGAGAGAAT CTCTAAGAAA GCCGAACTTA TTGAACAAAT TT - #CTATCGGA 660 - -
GAATACCGCA AAGGAGTTGT TAAAAACATT ACTGACTTTG GTGTATTCTT AG - #ATCTCGAT 720 - -
GGTATTGACG GTCTTCTCCA CATTACCGAT ATGACCTGGA AGCGCATACG AC - #ATCCTTCC 780 - -
GAAATGGTCG AATTGAATCA AGAGTTGGAA GTAATTATTT TAAGCGTAGA TA - #AAGAAAAA 840 - -
GGACGAGTTG CTCTAGGTCT CAAACAAAAA GAGCATAATC CTTGGGAAGA TA - #TTGAGAAG 900 - -
AAATACCCTC CTGGAAAACG AGTTCTTGGT AAAATTGTGA AGCTTCTCCC CT - #ACGGAGCT 960 - -
TTCATTGAAA TTGAAGAGGG CATTGAAGGT CTAATTCACA TTTCTGAAAT GT - #CTTGGGTG 1020 - -
AAAAATATTG TAGATCCTAG TGAAGTCGTA AATAAAGGCG ATGAAGTTGA AG - #CCATTGTT 1080 - -
CTATCTATTC AGAAGGACGA AGGAAAAATT TCTCTAGGAT TAAAGCAAAC AG - #AACGTAAT 1140 - -
CCTTGGGACA ATATCGAAGA AAAATATCCT ATAGGTCTCC ATGTCAATGC TG - #AAATCAAG 1200 - -
AACTTAACCA ATTACGGTGC TTTCGTTGAA TTAGAACCAG GAATTGAGGG TC - #TGATTCAT 1260 - -
ATTTCTGACA TGAGTTGGAT TAAAAAAGTC TCTCACCCTT CAGAACTATT CA - #AAAAAGGA 1320 - -
AATTCTGTAG AGGCTGTTAT TTTATCAGTA GACAAAGAAA GTAAAAAAAT TA - #CTTTAGGA 1380 - -
GTTAAGCAAT TAAGTTCTAA TCCTTGGAAT GAAATTGAAG CTATGTTCCC TG - #CTGGCACA 1440 - -
GTAATTTCAG GAGTTGTGAC TAAAATCACT GCATTTGGAG CCTTTGTTGA GC - #TACAAAAC 1500 - -
GGGATTGAAG GATTGATTCA CGTTTCAGAA CTTTCTGACA AGCCCTTTGC AA - #AAATTGAA 1560 - -
GATATTATCT CCATTGGAGA AAATGTTTCT GCAAAAGTAA TTAAGCTAGA TC - #CAGATCAT 1620 - -
AAAAAAGTTT CTCTTTCTGT AAAAGAATAC TTAGCTGACA ATGCTTATGA TC - #AAGACTCT 1680 - -
AGGACTGAAT TAGATTTCAA GGATTCTCAA GG - # - # 1712 - - - - (2) INFORMATION FOR SEQ ID
NO:9: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:1048 base pa - #irs (B) TYPE:
nucleic acid (C) STRANDEDNESS: double (D) TOPOLOGY: linear - - (ii) MOLECULE
TYPE:Genomic DNA - - (vi) ORIGINAL SOURCE: (A) ORGANISM: Chlamydia - #pneumoniae (B)
STRAIN: YK-41 - - (vii) IMMEDIATE SOURCE: (B) CLONE: 53-3S - - (ix) FEATURE: (A)
NAME/KEY: CDS (B) LOCATION: 236 to - #1012 (C) IDENTIFICATION METHOD: - # P - - (xi)
SEQUENCE DESCRIPTION: SEQ ID NO:9: - - TCAGTATCGG CGGAATTCGA ACCCCTTCGC GGCTCTTTCT
GGAACTCTAG AA - #TCTTTACA 60 - - TCTCGAAGAG TTAACTCAAG GATTATTCCC TTCTGCCCAA
GAAGATGCCA AC - #TTCGCAAA 120 - - GGAGTTATCT TCAGTAGTAC ACGGATTAAA AAACCTAACC
ACTGTAGTTA AT - #AAACAAAT 180 - - GGTTAAAGGC GCTGAGTAAA GCCCTTTGCA GAATCAAACC
CCTTAGGATA CA - #AAC ATG 238 - # - # - # Met - # - # - # - - TCT ATT TCA TCT TCT TCA
GGA CCT GAC AAT CA - #A AAA AAT ATC ATG TCT 286 Ser Ile Ser Ser Ser Ser Gly Pro Asp
Asn Gl - #n Lys Asn Ile Met Ser 5 - # 10 - # 15 - - CAA GTT CTG ACA TCG ACA CCC CAG
GGC GTG CC - #C CAA CAA GAT AAG CTG 334 Gln Val Leu Thr Ser Thr Pro Gln Gly Val Pr -
#o Gln Gln Asp Lys Leu 20 - # 25 - # 30 - - TCT GGC AAC GAA ACG AAG CAA ATA CAG CAA AC
- #A CGT CAG GGT AAA AAC 382 Ser Gly Asn Glu Thr Lys Gln Ile Gln Gln Th - #r Arg Gln
Gly Lys Asn 35 - # 40 - # 45 - - ACT GAG ATG GAA AGC GAT GCC ACT ATT GCT GG - #T GCT
TCT GGA AAA GAC 430 Thr Glu Met Glu Ser Asp Ala Thr Ile Ala Gl - #y Ala Ser Gly Lys
Asp 50 - # 55 - # 60 - # 65 - - AAA ACT TCC TCG ACT ACA AAA ACA GAA ACA GC - #T CCA
CAA CAG GGA GTT 478 Lys Thr Ser Ser Thr Thr Lys Thr Glu Thr Al - #a Pro Gln Gln Gly
Val 70 - # 75 - # 80 - - GCT GCT GGG AAA GAA TCC TCA GAA AGT CAA AA - #G GCA GGT GCT
GAT ACT 526 Ala Ala Gly Lys Glu Ser Ser Glu Ser Gln Ly - #s Ala Gly Ala Asp Thr 85 - #
90 - # 95 - - GGA GTA TCA GGA GCG GCT GCT ACT ACA GCA TC - #A AAT ACT GCA ACA AAA 574
Gly Val Ser Gly Ala Ala Ala Thr Thr Ala Se - #r Asn Thr Ala Thr Lys 100 - # 105 - #
110 - - ATT GCT ATG CAG ACC TCT ATT GAA GAG GCG AG - #C AAA AGT ATG GAG TCT 622 Ile
Ala Met Gln Thr Ser Ile Glu Glu Ala Se - #r Lys Ser Met Glu Ser 115 - # 120 - # 125 -
- ACC TTA GAG TCA CTT CAA AGC CTC AGT GCC GC - #G CAA ATG AAA GAA GTC 670 Thr Leu Glu
Ser Leu Gln Ser Leu Ser Ala Al - #a Gln Met Lys Glu Val 130 1 - #35 1 - #40 1 - #45 -
- GAA GCG GTT GTT GTT GCT GCC CTC TCA GGG AA - #A AGT TCG GGT TCC GCA 718 Glu Ala Val

Val Val Ala Ala Leu Ser Gly Ly - #s Ser Ser Gly Ser Ala 150 - # 155 - # 160 - - AAA
TTG GAA ACA CCT GAG CTC CCC AAG CCC GG - #G GTG ACA CCA AGA TCA 766 Lys Leu Glu Thr
Pro Glu Leu Pro Lys Pro Gl - #y Val Thr Pro Arg Ser 165 - # 170 - # 175 - - GAG GTT
ATC GAA ATC GGA CTC GCG CTT GCT AA - #A GCA ATT CAG ACA TTG 814 Glu Val Ile Glu Ile
Gly Leu Ala Leu Ala Ly - #s Ala Ile Gln Thr Leu 180 - # 185 - # 190 - - GGA GAA GCC
ACA AAA TCT GCC TTA TCT AAC TA - #T GCA AGT ACA CAA GCA 862 Gly Glu Ala Thr Lys Ser
Ala Leu Ser Asn Ty - #r Ala Ser Thr Gln Ala 195 - # 200 - # 205 - - CAA GCA GAC CAA
ACA AAT AAA CTA GGT CTA GA - #A AAG CAA GCG ATA AAA 910 Gln Ala Asp Gln Thr Asn Lys
Leu Gly Leu Gl - #u Lys Gln Ala Ile Lys 210 2 - #15 2 - #20 2 - #25 - - ATC GAT AAA
GAA CGA GAA GAA TAC CAA GAG AT - #G AAG GCT GCC GAA CAG 958 Ile Asp Lys Glu Arg Glu
Glu Tyr Gln Glu Me - #t Lys Ala Ala Glu Gln 230 - # 235 - # 240 - - AAG TCT AAA GAT
CTC GAA GGA ACA ATG GAT AC - #T GTC AAT ACT GTG ATG 1006 Lys Ser Lys Asp Leu Glu Gly
Thr Met Asp Th - #r Val Asn Thr Val Met 245 - # 250 - # 255 - - ATC GCG AAGGGGTTCG
AATTCCAGCT GAGCGCCGGT CGCTAC - # - #1048 Ile Ala - - - - (2) INFORMATION FOR SEQ ID
NO:10: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH: 5658 base - #pairs (B) TYPE:
nucleic acid (C) STRANDEDNESS: double (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE:
Other nucleic acid; - #Plasmid - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:10: - -
ATCGATGTTA ACAGATCTAA GCTTAACTAA CTAACTCCGG AAAAGGAGGA AC - #TTCCATGA 60 - -
TCAGTCTGAT TGCGGCGTTA GCGGTAGATC GCGTTATCGG CATGGAAAAC GC - #CATGCCGT 120 - -
GGAACCTGCC TGCCGATCTC GCCTGGTTTA AACGCAACAC CTTAAATAAA CC - #CGTGATTA 180 - -
TGGGCCGCCA TACCTGGGAA TCAATCGGTC GTCCGTTGCC AGGACGCAAA AA - #TATTATCC 240 - -
TCAGCAGTCA ACCGGGTACG GACGATCGCG TAACGTGGGT GAAGTCGGTG GA - #TGAAGCCA 300 - -
TCGCGGCGTG TGGTGACGTA CCAGAAATCA TGGTGATTGG CGGCGGTCGC GT - #TTATGAAC 360 - -
AGTTCTTGCC AAAAGCGCAA AAACTGTATC TGACGCATAT CGACGCAGAA GT - #GGAAGGCG 420 - -
ACACCCATTT CCCGGATTAC GAGCCGGATG ACTGGGAATC GGTATTCAGC GA - #ATTCCACG 480 - -
ATGCTGATGC GCAGAACTCT CACAGCTATG AGTTCGAAAT TCTGGAGCGG CG - #GATCCAAT 540 - -
TCGAACCCCT TCGCGGCTCT TTCTGGAACT CTAGAATCTT TACATCTCGA AG - #AGTTAACT 600 - -
CAAGGATTAT TCCCTTCTGC CCAAGAAGAT GCCAACTTCG CAAAGGAGTT AT - #CTTCAGTA 660 - -
GTACACGGAT TAAAAAACCT AACCACTGTA GTTAATAAAC AAATGGTTAA AG - #GCGCTGAG 720 - -
TAAAGCCCTT TGCAGAATCA AACCCCTTAG GATACAAACA TGTCTATTTC AT - #CTTCTTCA 780 - -
GGACCTGACA ATCAAAAAAA TATCATGTCT CAAGTTCTGA CATCGACACC CC - #AGGGCGTG 840 - -
CCCCAACAAG ATAAGCTGTC TGGCAACGAA ACGAAGCAAA TACAGCAAAC AC - #GTCAGGGT 900 - -
AAAAACACTG AGATGGAAAG CGATGCCACT ATTGCTGGTG CTTCTGGAAA AG - #ACAAAACT 960 - -
TCCTCGACTA CAAAAACAGA AACAGCTCCA CAACAGGGAG TTGCTGCTGG GA - #AAGAATCC 1020 - -
TCAGAAAGTC AAAAGGCAGG TGCTGATACT GGAGTATCAG GAGCGGCTGC TA - #CTACAGCA 1080 - -
TCAAATACTG CAACAAAAAT TGCTATGCAG ACCTCTATTG AAGAGGCGAG CA - #AAAGTATG 1140 - -
GAGTCTACCT TAGAGTCACT TCAAAGCCTC AGTGCCGCGC AAATGAAAGA AG - #TCGAAGCG 1200 - -
GTTGTTGTTG CTGCCCTCTC AGGGAAAAGT TCGGGTTCCG CAAAATTGGA AA - #CACCTGAG 1260 - -
CTCCCCAAGC CCGGGGTGAC ACCAAGATCA GAGGTTATCG AAATCGGACT CG - #CGCTTGCT 1320 - -
AAAGCAATTC AGACATTGGG AGAAGCCACA AAATCTGCCT TATCTAACTA TG - #CAAGTACA 1380 - -
CAAGCACAAG CAGACCAAAC AAATAAACTA GGTCTAGAAA AGCAAGCGAT AA - #AAATCGAT 1440 - -
AAAGAACGAG AAGAATACCA AGAGATGAAG GCTGCCGAAC AGAAGTCTAA AG - #ATCTCGAA 1500 - -
GGAACAATGG ATACTGTCAA TACTGTGATG ATCGCGAAGG GGTTCGAATT GC - #CATGGGGG 1560 - -
CCCTTAATTA ATTAACTCGA GAGATCCAGA TCTAATCGAT GATCCTCTAC GC - #CGGACGCA 1620 - -
TCGTGGCCGG CATCACCGGC GCCACAGGTG CGGTTGCTGG CGCCTATATC GC - #CGACATCA 1680 - -
CCGATGGGGA AGATCGGGCT CGCCACTTCG GGCTCATGAG CGCTTGTTTC GG - #CGTGGGTA 1740 - -
TGGTGGCAGG CCCGTGGCCG GGGGACTGTT GGGCGCCATC TCCTTGCATG CA - #CCATTCCT 1800 - -
TGCGGCGGCG GTGCTCAACG GCCTCAACCT ACTACTGGGC TGCTTCCTAA TG - #CAGGAGTC 1860 - -
GCATAAGGGA GAGCGTCGAC CGATGCCCTT GAGAGCCTTC AACCCAGTCA GC - #TCCTTCCG 1920 - -
GTGGGCGCGG GGCATGACTA TCGTCGCCGC ACTTATGACT GTCTTCTTTA TC - #ATGCAACT 1980 - -
CGTAGGACAG GTGCCGGCAG CGCTCTGGGT CATTTTCGGC GAGGACCGCT TT -

Detailed Description Paragraph Table (5):
#CGCTGGAG 2040 - - CGCGACGATG ATCGGCCTGT CGCTTGCGGT ATTCGGAATC TTGCACGCCC TC -
#GCTCAAGC 2100 - - CTTCGTCACT GGTCCCGCCA CCAAACGTTT CGGCGAGAAG CAGGCCATTA TC -
#GCCGGCAT 2160 - - GGCGGCCGAC GCGCTGGGCT ACGTCTTGCT GGCGTTCGCG ACGCGAGGCT GG -
#ATGGCCTT 2220 - - CCCCATTATG ATTCTTCTCG CTTCCGGCGG CATCGGGATG CCCGCGTTGC AG -
#GCCATGCT 2280 - - GTCCAGGCAG GTAGATGACG ACCATCAGGG ACAGCTTCAA GGATCGCTCG CG -
#GCTCTTAC 2340 - - CAGCCTAACT TCGATCACTG GACCGCTGAT CGTCACGGCG ATTTATGCCG CC -
#TCGGCGAG 2400 - - CACATGGAAC GGGTTGGCAT GGATTGTAGG CGCCGCCCTA TACCTTGTCT GC -
#CTCCCCGC 2460 - - GTTGCGTCGC GGTGCATGGA GCCGGGCCAC CTCGACCTGA ATGGAAGCCG GC -
#GGCACCTC 2520 - - GCTAACGGAT TCACCACTCC AAGAATTGGA GCCAATCAAT TCTTGCGGAG AA -
#CTGTGAAT 2580 - - GCGCAAACCA ACCCTTGGCA GAACATATCC ATCGCGTCCG CCATCTCCAG CA -
#GCCGCACG 2640 - - CGGCGCATCT CGGGCAGCGT TGGGTCCTGG CCACGGGTGC GCATGATCGT GC -
#TCCTGTCG 2700 - - TTGAGGACCC GGCTAGGCTG GCGGGGTTGC CTTACTGGTT AGCAGAATGA AT -

#CACCGATA 2760 - - CGCGAGCGAA CGTGAAGCGA CTGCTGCTGC AAAACGTCTG CGACCTGAGC AA -
#CAACATGA 2820 - - ATGGTCTTCG GTTTCCGTGT TTCGTAAAGT CTGGAAACGC GGAAGTCAGC GC -
#CCTGCACC 2880 - - ATTATGTTCC GGATCTGCAT CGCAGGATGC TGCTGGCTAC CCTGTGGAAC AC -
#CTACATCT 2940 - - GTATTAACGA AGCGCTGGCA TTGACCCTGA GTGATTTTTC TCTGGTCCCG CC -
#GCATCCAT 3000 - - ACCGCCAGTT GTTTACCCTC ACAACGTTCC AGTAACCGGG CATGTTCATC AT -
#CAGTAACC 3060 - - CGTATCGTGA GCATCCTCTC TCGTTTCATC GGTATCATTA CCCCCATGAA CA -
#GAAATTCC 3120 - - CCCTTACACG GAGGCATCAA GTGACCAAAC AGGAAAAAAC CGCCCTTAAC AT -
#GGCCCGCT 3180 - - TTATCAGAAG CCAGACATTA ACGCTTCTGG AGAAACTCAA CGAGCTGGAC GC -
#GGATGAAC 3240 - - AGGCAGACAT CTGTGAATCG CTTCACGACC ACGCTGATGA GCTTTACCGC AG -
#CTGCCTCG 3300 - - CGCGTTTCGG TGATGACGGT GAAAACCTCT GACACATGCA GCTCCCGGAG AC -
#GGTCACAG 3360 - - CTTGTCTGTA AGCGGATGCC GGGAGCAGAC AAGCCCGTCA GGGCGCGTCA GC -
#GGGTGTTG 3420 - - GCGGGTGTCG GGGCGCAGCC ATGACCCAGT CACGTAGCGA TAGCGGAGTG TA -
#TACTGGCT 3480 - - TAACTATGCG GCATCAGAGC AGATTGTACT GAGAGTGCAC CATATGCGGT GT -
#GAAATACC 3540 - - GCACAGATGC GTAAGGAGAA AATACCGCAT CAGGCGCTCT TCCGCTTCCT CG -
#CTCACTGA 3600 - - CTCGCTGCGC TCGGTCGTTC GGCTGCGGCG AGCGGTATCA GCTCACTCAA AG -
#GCGGTAAT 3660 - - ACGGTTATCC ACAGAATCAG GGGATAACGC AGGAAAGAAC ATGTGAGCAA AA -
#GGCCAGCA 3720 - - AAAGGCCAGG AACCGTAAAA AGGCCGCGTT GCTGGCGTTT TTCCATAGGC TC -
#CGCCCCCC 3780 - - TGACGAGCAT CACAAAAATC GACGCTCAAG TCAGAGGTGG CGAAACCCGA CA -
#GGACTATA 3840 - - AAGATACCAG GCGTTTCCCC CTGGAAGCTC CCTCGTGCGC TCTCCTGTTC CG -
#ACCCTGCC 3900 - - GCTTACCGGA TACCTGTCCG CCTTTCTCCC TTCGGGAAGC GTGGCGCTTT CT -
#CAATGCTC 3960 - - ACGCTGTAGG TATCTCAGTT CGGTGTAGGT CGTTCGCTCC AAGCTGGGCT GT -
#GTGCACGA 4020 - - ACCCCCCGTT CAGCCCGACC GCTGCGCCTT ATCCGGTAAC TATCGTCTTG AG -
#TCCAACCC 4080 - - GGTAAGACAC GACTTATCGC CACTGGCAGC AGCCACTGGT AACAGGATTA GC -
#AGAGCGAG 4140 - - GTATGTAGGC GGTGCTACAG AGTTCTTGAA GTGGTGGCCT AACTACGGCT AC -
#ACTAGAAG 4200 - - GACAGTATTT GGTATCTGCG CTCTGCTGAA GCCAGTTACC TTCGGAAAAA GA -
#GTTGGTAG 4260 - - CTCTTGATCC GGCAAACAAA CCACCGCTGG TAGCGGTGGT TTTTTTGTTT GC -
#AAGCAGCA 4320 - - GATTACGCGC AGAAAAAAAG GATCTCAAGA AGATCCTTTG ATCTTTTCTA CG -
#GGGTCTGA 4380 - - CGCTCAGTGG AACGAAAACT CACGTTAAGG GATTTTGGTC ATGAGATTAT CA -
#AAAAGGAT 4440 - - CTTCACCTAG ATCCTTTTAA ATTAAAAATG AAGTTTTAAA TCAATCTAAA GT -
#ATATATGA 4500 - - GTAAACTTGG TCTGACAGTT ACCAATGCTT AATCAGTGAG GCACCTATCT CA -
#GCGATCTG 4560 - - TCTATTTCGT TCATCCATAG TTGCCTGACT CCCCGTCGTG TAGATAACTA CG -
#ATACGGGA 4620 - - GGGCTTACCA TCTGGCCCCA GTGCTGCAAT GATACCGCGA GACCCACGCT CA -
#CCGGCTCC 4680 - - AGATTTATCA GCAATAAACC AGCCAGCCGG AAGGGCCGAG CGCAGAAGTG GT -
#CCTGCAAC 4740 - - TTTATCCGCC TCCATCCAGT CTATTAATTG TTGCCGGGAA GCTAGAGTAA GT -
#AGTTCGCC 4800 - - AGTTAATAGT TTGCGCAACG TTGTTGCCAT TGCTGCAGGC ATCGTGGTGT CA -
#CGCTCGTC 4860 - - GTTTGGTATG GCTTCATTCA GCTCCGGTTC CCAACGATCA AGGCGAGTTA CA -
#TGATCCCC 4920 - - CATGTTGTGC AAAAAAGCGG TTAGCTCCTT CGGTCCTCCG ATCGTTGTCA GA -
#AGTAAGTT 4980 - - GGCCGCAGTG TTATCACTCA TGGTTATGGC AGCACTGCAT AATTCTCTTA CT -
#GTCATGCC 5040 - - ATCCGTAAGA TGCTTTTCTG TGACTGGTGA GTACTCAACC AAGTCATTCT GA -
#GAATAGTG 5100 - - TATGCGGCGA CCGAGTTGCT CTTGCCCGGC GTCAACACGG GATAATACCG CG -
#CCACATAG 5160 - - CAGAACTTTA AAAGTGCTCA TCATTGGAAA ACGTTCTTCG GGGCGAAAAC TC -
#TCAAGGAT 5220 - - CTTACCGCTG TTGAGATCCA GTTCGATGTA ACCCACTCGT GCACCCAACT GA -
#TCTTCAGC 5280 - - ATCTTTTACT TTCACCAGCG TTTCTGGGTG AGCAAAAACA GGAAGGCAAA AT -
#GCCGCAAA 5340 - - AAAGGGAATA AGGGCGACAC GGAAATGTTG AATACTCATA CTCTTCCTTT TT -
#CAATATTA 5400 - - TTGAAGCATT TATCAGGGTT ATTGTCTCAT GAGCGGATAC ATATTTGAAT GT -
#ATTTAGAA 5460 - - AAATAAACAA ATAGGGGTTC CGCGCACATT TCCCCGAAAA GTGCCACCTG AC -
#GTCTAAGA 5520 - - AACCATTATT ATCATGACAT TAACCTATAA AAATAGGCGT ATCACGAGGC CC -
#TTTCGTCT 5580 - - TCAAGAATTA ATTGTTATCC GCTCACAATT AATTCTTGAC AATTAGTTAA CT -
#ATTTGTTA 5640 - - TAATGTATTC ATAAGCTT - # - # - #5658 - - - - (2) INFORMATION FOR SEQ ID NO:11: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:35 (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:11: - - GATCCAATTG CCATGGGGGC CCTTAATTAA TTAAC - # - # 35 - - - - (2) INFORMATION FOR SEQ ID NO:12: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:35 base pair - #s (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:12: - - TCGAGTTAAT TAATTAAGGG CCCCCATGGC AATTG - # - # 35 - - - - (2) INFORMATION FOR SEQ ID NO:13: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:1954 base pa - #irs (B) TYPE: nucleic acid (C) STRANDEDNESS: double (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE:Genomic DNA - - (vi) ORIGINAL SOURCE: (A) ORGANISM: Chlamydia - #pneumoniae (B) STRAIN: YK-41 - - (vii) IMMEDIATE SOURCE: (B) CLONE: 70-2S - - (ix) FEATURE: (A) NAME/KEY: -35 signa - #1 (B) LOCATION:146 to 151 (C) IDENTIFICATION METHOD: - # by similarity with known sequence or to - #an established consensus sequence - - (ix) FEATURE: (A) NAME/KEY: -10 signa - #1 (B) LOCATION:169 to 174 (C) IDENTIFICATION METHOD: - # by similarity with known sequence or to - #an established consensus sequence - - (ix) FEATURE: (A)

NAME/KEY: RBS (B) LOCATION:199 to 205 (C) IDENTIFICATION METHOD: - # by similarity with known sequence or to - #an established consensus sequence - - (ix) FEATURE: (A) NAME/KEY:CDS (B) LOCATION:215 to 192 - #7 (C) IDENTIFICATION METHOD: - # by similarity with known sequence or to - #an established consensus sequence - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:13: - - TTGACACCAG ACCAACTGGT AATGGTAGCG ACCGGCGCTC AGCTGGAATT CG - #AACCCCTT 60 - - CGCCTTATAC ATCTCTAGAA CGGAAGTATA GGATTTTACG ATTAATTCGA TT - #ATATAGAA 120 - - CTAATCGTCT CCTGCAAGGG AGGTCTTGCC TTTTTTAAGG TTTATATTTA CA - #CTGTCTTT 180 - - TTTGACTTTG TAGTTTTTAG GAGAATAACA ATAA ATG CCA AAA C - #AA GCT GAA TAT 235 - # - # Met Pro Lys Gln Ala Glu Tyr - # - # 1 - # 5 - - ACT TGG GGA TCT AAA AAA ATT CTG GAC AAT AT - #A GAA TGC CTC ACA GAA 283 Thr Trp Gly Ser Lys Lys Ile Leu Asp Asn Il - #e Glu Cys Leu Thr Glu 10 - # 15 - # 20 - - GAC GTT GCC GAA TTT AAA GAT TTG CTT TAT AC - #G GCA CAC AGA ATT ACT 331 Asp Val Ala Glu Phe Lys Asp Leu Leu Tyr Th - #r Ala His Arg Ile Thr 25 - # 30 - # 35 - - TCG AGC GAA GAA GAA TCT GAT AAC GAA ATA CA - #G CCT GGC GCC ATC CTA 379 Ser Ser Glu Glu Glu Ser Asp Asn Glu Ile Gl - #n Pro Gly Ala Ile Leu 40 - # 45 - # 50 - # 55 - - AAA GGT ACC GTA GTT GAT ATT AAT AAA GAC TT - #T GTC GTA GTT GAT GTT 427 Lys Gly Thr Val Val Asp Ile Asn Lys Asp Ph - #e Val Val Val Asp Val 60 - # 65 - # 70 - - GGT CTG AAG TCT GAG GGA GTG ATC CCT ATG TC - #A GAG TTC ATA GAC TCT 475 Gly Leu Lys Ser Glu Gly Val Ile Pro Met Se - #r Glu Phe Ile Asp Ser 75 - # 80 - # 85 - - TCA GAA GGT TTA GTG CTT GGA GCT GAA GTA GA - #A GTC TAT CTC GAC CAA 523 Ser Glu Gly Leu Val Leu Gly Ala Glu Val Gl - #u Val Tyr Leu Asp Gln 90 - # 95 - # 100 - - GCC GAA GAC GAA GAG GGC AAA GTT GTC CTT TC - #T AGA GAA AAA GCC ACA 571 Ala Glu Asp Glu Glu Gly Lys Val Val Leu Se - #r Arg Glu Lys Ala Thr 105 - # 110 - # 115 - - CGA CAA CGT CAA TGG GAA TAC ATC TTA GCT CA - #T TGT GAA GAA GGT TCT 619 Arg Gln Arg Gln Trp Glu Tyr Ile Leu Ala Hi - #s Cys Glu Glu Gly Ser 120 1 - #25 1 - #30 1 - #35 - - ATT GTT AAA GGT CAA ATT ACA CGT AAA GTC AA - #A GGC GGC CTT ATT GTA 667 Ile Val Lys Gly Gln Ile Thr Arg Lys Val Ly - #s Gly Gly Leu Ile Val 140 - # 145 - # 150 - - GAT ATT GGA ATG GAA GCC TTC CTA CCT GGA TC - #A CAA ATT GAC AAC AAG 715 Asp Ile Gly Met Glu Ala Phe Leu Pro Gly Se - #r Gln Ile Asp Asn Lys 155 - # 160 - # 165 - - AAA ATC AAA AAT TTA GAT GAT TAT GTC GGA AA - #A GTT TGT GAA TTC AAA 763 Lys Ile Lys Asn Leu Asp Asp Tyr Val Gly Ly - #s Val Cys Glu Phe Lys 170 - # 175 - # 180 - - ATT TTA AAA ATT AAC GTT GAA CGT CGC AAT AT - #T GTT GTC TCA AGA AGA 811

Detailed Description Paragraph Table (6):

Ile Leu Lys Ile Asn Val Glu Arg Arg Asn Il - #e Val Val Ser Arg Arg 185 - # 190 - # 195 - - GAA CTC TTA GAA GCT GAG AGA ATC TCT AAG AA - #A GCC GAA CTT ATT GAA 859 Glu Leu Leu Glu Ala Glu Arg Ile Ser Lys Ly - #s Ala Glu Leu Ile Glu 200 2 - #05 2 - #10 2 - #15 - - CAA ATT TCT ATC GGA GAA TAC CGC AAA GGA GT - #T GTT AAA AAC ATT ACT 907 Gln Ile Ser Ile Gly Glu Tyr Arg Lys Gly Va - #l Val Lys Asn Ile Thr 220 - # 225 - # 230 - - GAC TTT GGT GTA TTC TTA GAT CTC GAT GGT AT - #T GAC GGT CTT CTC CAC 955 Asp Phe Gly Val Phe Leu Asp Leu Asp Gly Il - #e Asp Gly Leu Leu His 235 - # 240 - # 245 - - ATT ACC GAT ATG ACC TGG AAG CGC ATA CGA CA - #T CCT TCC GAA ATG GTC 1003 Ile Thr Asp Met Thr Trp Lys Arg Ile Arg Hi - #s Pro Ser Glu Met Val 250 - # 255 - # 260 - - GAA TTG AAT CAA GAG TTG GAA GTA ATT ATT TT - #A AGC GTA GAT AAA GAA 1051 Glu Leu Asn Gln Glu Leu Glu Val Ile Ile Le - #u Ser Val Asp Lys Glu 265 - # 270 - # 275 - - AAA GGA CGA GTT GCT CTA GGT CTC AAA CAA AA - #A GAG CAT AAT CCT TGG 1099 Lys Gly Arg Val Ala Leu Gly Leu Lys Gln Ly - #s Glu His Asn Pro Trp 280 2 - #85 2 - #90 2 - #95 - - GAA GAT ATT GAG AAG AAA TAC CCT CCT GGA AA - #A CGA GTT CTT GGT AAA 1147 Glu Asp Ile Glu Lys Lys Tyr Pro Pro Gly Ly - #s Arg Val Leu Gly Lys 300 - # 305 - # 310 - - ATT GTG AAG CTT CTC CCC TAC GGA GCT TTC AT - #T GAA ATT GAA GAG GGC 1195 Ile Val Lys Leu Leu Pro Tyr Gly Ala Phe Il - #e Glu Ile Glu Glu Gly 315 - # 320 - # 325 - - ATT GAA GGT CTA ATT CAC ATT TCT GAA ATG TC - #T TGG GTG AAA AAT ATT 1243 Ile Glu Gly Leu Ile His Ile Ser Glu Met Se - #r Trp Val Lys Asn Ile 330 - # 335 - # 340 - - GTA GAT CCT AGT GAA GTC GTA AAT AAA GGC GA - #T GAA GTT GAA GCC ATT 1291 Val Asp Pro Ser Glu Val Val Asn Lys Gly As - #p Glu Val Glu Ala Ile 345 - # 350 - # 355 - - GTT CTA TCT ATT CAG AAG GAC GAA GGA AAA AT - #T TCT CTA GGA TTA AAG 1339 Val Leu Ser Ile Gln Lys Asp Glu Gly Lys Il - #e Ser Leu Gly Leu Lys 360 3 - #65 3 - #70 3 - #75 - - CAA ACA GAA CGT AAT CCT TGG GAC AAT ATC GA - #A GAA AAA TAT CCT ATA 1387 Gln Thr Glu Arg Asn Pro Trp Asp Asn Ile Gl - #u Glu Lys Tyr Pro Ile 380 - # 385 - # 390 - - GGT CTC CAT GTC AAT GCT GAA ATC AAG AAC TT - #A ACC AAT TAC GGT GCT 1435 Gly Leu His Val Asn Ala Glu Ile Lys Asn Le - #u Thr Asn Tyr Gly Ala 395 - # 400 - # 405 - - TTC GTT GAA TTA GAA CCA GGA ATT GAG GGT CT - #G ATT CAT ATT TCT GAC 1483 Phe Val Glu Leu Glu Pro Gly Ile Glu Gly Le - #u Ile His Ile Ser Asp 410 - # 415 - # 420 - - ATG AGT TGG ATT AAA AAA GTC TCT CAC CCT TC - #A GAA CTA TTC AAA AAA 1531 Met Ser Trp Ile Lys Lys Val Ser His Pro Se - #r Glu Leu Phe Lys Lys 425 - # 430 - # 435 - - GGA AAT TCT GTA GAG GCT GTT ATT TTA TCA GT - #A GAC AAA GAA AGT AAA 1579 Gly Asn Ser Val Glu Ala Val Ile Leu Ser Va - #l Asp

Lys Glu Ser Lys 440 4 - #45 4 - #50 4 - #55 - - AAA ATT ACT TTA GGA GTT AAG CAA TTA AGT TC - #T AAT CCT TGG AAT GAA 1627 Lys Ile Thr Leu Gly Val Lys Gln Leu Ser Se - #r Asn Pro Trp Asn Glu 460 - # 465 - # 470 - - ATT GAA GCT ATG TTC CCT GCT GGC ACA GTA AT - #T TCA GGA GTT GTG ACT 1675 Ile Glu Ala Met Phe Pro Ala Gly Thr Val Il - #e Ser Gly Val Val Thr 475 - # 480 - # 485 - - AAA ATC ACT GCA TTT GGA GCC TTT GTT GAG CT - #A CAA AAC GGG ATT GAA 1723 Lys Ile Thr Ala Phe Gly Ala Phe Val Glu Le - #u Gln Asn Gly Ile Glu 490 - # 495 - # 500 - - GGA TTG ATT CAC GTT TCA GAA CTT TCT GAC AA - #G CCC TTT GCA AAA ATT 1771 Gly Leu Ile His Val Ser Glu Leu Ser Asp Ly - #s Pro Phe Ala Lys Ile 505 - # 510 - # 515 - - GAA GAT ATT ATC TCC ATT GGA GAA AAT GTT TC - #T GCA AAA GTA ATT AAG 1819 Glu Asp Ile Ile Ser Ile Gly Glu Asn Val Se - #r Ala Lys Val Ile Lys 520 5 - #25 5 - #30 5 - #35 - - CTA GAT CCA GAT CAT AAA AAA GTT TCT CTT TC - #T GTA AAA GAA TAC TTA 1867 Leu Asp Pro Asp His Lys Lys Val Ser Leu Se - #r Val Lys Glu Tyr Leu 540 - # 545 - # 550 - - GCT GAC AAT GCT TAT GAT CAA GAC TCT AGG AC - #T GAA TTA GAT TTC AAG 1915 Ala Asp Asn Ala Tyr Asp Gln Asp Ser Arg Th - #r Glu Leu Asp Phe Lys 555 - # 560 - # 565 - - GAT TCT CAA GGC GAA GGG GTT CGA ATT CCG CC - #G ATA CTG - # 1954 Asp Ser Gln Gly Glu Gly Val Arg Ile Pro Pr - #o Ile Leu 570 - # 575 - # 580 - - - - (2) INFORMATION FOR SEQ ID NO:14: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:160 amino ac - #ids (B) TYPE: amino acid (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: peptide - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:14: - - Met Ile Ser Leu Ile Ala Ala Leu Ala Val As - #p Arg Val Ile Gly Met 1 5 - # 10 - # 15 - - Glu Asn Ala Met Pro Trp Asn Leu Pro Ala As - #p Leu Ala Trp Phe Lys 20 - # 25 - # 30 - - Arg Asn Thr Leu Asn Lys Pro Val Ile Met Gl - #y Arg His Thr Trp Glu 35 - # 40 - # 45 - - Ser Ile Gly Arg Pro Leu Pro Gly Arg Lys As - #n Ile Ile Leu Ser Ser 50 - # 55 - # 60 - - Gln Pro Gly Thr Asp Asp Arg Val Thr Trp Va - #l Lys Ser Val Asp Glu 65 - # 70 - # 75 - # 80 - - Ala Ile Ala Ala Cys Gly Asp Val Pro Glu Il - #e Met Val Ile Gly Gly 85 - # 90 - # 95 - - Gly Arg Val Tyr Glu Gln Phe Leu Pro Lys Al - #a Gln Lys Leu Tyr Leu 100 - # 105 - # 110 - - Thr His Ile Asp Ala Glu Val Glu Gly Asp Th - #r His Phe Pro Asp Tyr 115 - # 120 - # 125 - - Glu Pro Asp Asp Trp Glu Ser Val Phe Ser Gl - #u Phe His Asp Ala Asp 130 - # 135 - # 140 - - Ala Gln Asn Ser His Ser Tyr Glu Phe Glu Il - #e Leu Glu Arg Arg Ile 145 1 - #50 1 - #55 1 - #60 - - - - (2) INFORMATION FOR SEQ ID NO:15: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:649 amino ac - #ids (B) TYPE: amino acid (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: peptide - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:15: - - Met Ile Ser Leu Ile Ala Ala Leu Ala Val As - #p Arg Val Ile Gly Met 1 5 - # 10 - # 15 - - Glu Asn Ala Met Pro Trp Asn Leu Pro Ala As - #p Leu Ala Trp Phe Lys 20 - # 25 - # 30 - - Arg Asn Thr Leu Asn Lys Pro Val Ile Met Gl - #y Arg His Thr Trp Glu 35 - # 40 - # 45 - - Ser Ile Gly Arg Pro Leu Pro Gly Arg Lys As - #n Ile Ile Leu Ser Ser 50 - # 55 - # 60 - - Gln Pro Gly Thr Asp Asp Arg Val Thr Trp Va - #l Lys Ser Val Asp Glu 65 - # 70 - # 75 - # 80 - - Ala Ile Ala Ala Cys Gly Asp Val Pro Glu Il - #e Met Val Ile Gly Gly 85 - # 90 - # 95 - - Gly Arg Val Tyr Glu Gln Phe Leu Pro Lys Al - #a Gln Lys Leu Tyr Leu 100 - # 105 - # 110 - - Thr His Ile Asp Ala Glu Val Glu Gly Asp Th - #r His Phe Pro Asp Tyr 115 - # 120 - # 125 - - Glu Pro Asp Asp Trp Glu Ser Val Phe Ser Gl - #u Phe His Asp Ala Asp 130 - # 135 - # 140 - - Ala Gln Asn Ser His Ser Tyr Glu Phe Glu Il - #e Leu Glu Arg Arg Ile 145 1 - #50 1 - #55 1 - #60 - - Leu Met Ser Ile Ser Ser Ser Ser Gly Pro As - #p Asn Gln Lys Asn Ile 165 - # 170 - # 175 - - Met Ser Gln Val Leu Thr Ser Thr Pro Gln Gl - #y Val Pro Gln Gln Asp 180 - # 185 - # 190 - - Lys Leu Ser Gly Asn Glu Thr Lys Gln Ile Gl - #n Gln Thr Arg Gln Gly 195 - # 200 - # 205 - - Lys Asn Thr Glu Met Glu Ser Asp Ala Thr Il - #e Ala Gly Ala Ser Gly 210 - # 215 - # 220 - - Lys Asp Lys Thr Ser Ser Thr Thr Lys Thr Gl - #u Thr Ala Pro Gln Gln 225 2 - #30 2 - #35 2 - #40 - - Gly Val Ala Ala Gly Lys Glu Ser Ser Glu Se - #r Gln Lys Ala Gly Ala 245 - # 250 - # 255 - - Asp Thr Gly Val Ser Gly Ala Ala Ala Thr Th - #r Ala Ser Asn Thr Ala 260 - # 265 - # 270 - - Thr Lys Ile Ala Met Gln Thr Ser Ile Glu Gl - #u Ala Ser Lys Ser Met 275 - # 280 - # 285 - - Glu Ser Thr Leu Glu Ser Leu Gln Ser Leu Se - #r Ala Ala Gln Met Lys 290 - # 295 - # 300 - - Glu Val Glu Ala Val Val Val Ala Ala Leu Se - #r Gly Lys Ser Ser Gly 305 3 - #10 3 - #15 3 - #20 - - Ser Ala Lys Leu Glu Thr Pro Glu Leu Pro Ly - #s Pro Gly Val Thr Pro 325 - # 330 - # 335 - - Arg Ser Glu Val Ile Glu Ile Gly Leu Ala Le - #u Ala Lys Ala Ile Gln 340 - # 345 - # 350 - - Thr Leu Gly Glu Ala Thr Lys Ser Ala Leu Se - #r Asn Tyr Ala Ser Thr 355 - # 360 - # 365 - - Gln Ala Gln Ala Asp Gln Thr Asn Lys Leu Gl - #y Leu Glu Lys Gln Ala 370 - # 375 - # 380 - - Ile Lys Ile Asp Lys Glu Arg Glu Glu Tyr Gl - #n Glu Met Lys Ala Ala 385 3 - #90 3 - #95 4 - #00 - - Glu Gln Lys Ser Lys Asp Leu Glu Gly Thr Me - #t Asp Thr Val Asn Thr 405 - # 410 - # 415 - - Val Met Ile Ala Val Ser Val Ala Ile Thr Va - #l Ile Ser Ile Val Ala 420 - # 425 - # 430 - - Ala Ile Phe Thr Cys Gly Ala Gly Leu Ala Gl - #y Leu Ala Ala Gly Ala 435 - # 440 - # 445 - - Ala Val Gly Ala Ala Ala Ala Gly Gly Ala Al - #a Gly Ala Ala Ala Ala 450 - # 455 - # 460 - - Thr Thr Val Ala Thr Gln Ile Thr Val Gln Al - #a Val Val Gln Ala Val 465 4 - #70 4 - #75 4 - #80 - -

Lys Gln Ala Val Ile Thr Ala Val Arg Gln Al - #a Ile Thr Ala Ala Ile 485 - # 490 - # 495 - - Lys Ala Ala Val Lys Ser Gly Ile Lys Ala Ph - #e Ile Lys Thr Leu Val 500 - # 505 - # 510 - - Lys Ala Ile Ala Lys Ala Ile Ser Lys Gly Il - #e Ser Lys Val Phe Ala 515 - # 520 - # 525 - - Lys Gly Thr Gln Met Ile Ala Lys Asn Phe Pr - #o Lys Leu Ser Lys Val 530 - # 535 - # 540 - - Ile Ser Ser Leu Thr Ser Lys Trp Val Thr Va - #l Gly Val Gly Val Val 545 5 - #50 5 - #55 5 - #60 - - Val Ala Ala Pro Ala Leu Gly Lys Gly Ile Me - #t Gln Met Gln Leu Ser 565 - # 570 - # 575 - - Glu Met Gln Gln Asn Val Ala Gln Phe Gln Ly - #s Glu Val Gly Lys Leu 580 - # 585 - # 590 - - Gln Ala Ala Ala Asp Met Ile Ser Met Phe Th - #r Gln Phe Trp Gln Gln 595 - # 600 - # 605 - - Ala Ser Lys Ile Ala Ser Lys Gln Thr Gly Gl - #u Ser Asn Glu Met Thr 610 - # 615 - # 620 - - Gln Lys Ala Thr Lys Leu Gly Ala Gln Ile Le - #u Lys Ala Tyr Ala Ala 625 6 - #30 6 - #35 6 - #40 - - Ile Ser Gly Ala Ile Ala Gly Ala Ala 645 - - - - (2) INFORMATION FOR SEQ ID NO:16: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:432 amino ac - #ids (B) TYPE: amino acid (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: peptide - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:16: - - Met Ile Ser Leu Ile Ala Ala Leu Ala Val As - #p Arg Val Ile Gly Met 1 5 - # 10 - # 15 - - Glu Asn Ala Met Pro Trp Asn Leu Pro Ala As - #p Leu Ala Trp Phe Lys 20 - # 25 - # 30 - - Arg Asn Thr Leu Asn Lys Pro Val Ile Met Gl - #y Arg His Thr Trp Glu 35 - # 40 - # 45 - - Ser Ile Gly Arg Pro Leu Pro Gly Arg Lys As - #n Ile Ile Leu Ser Ser 50 - # 55 - # 60 - - Gln Pro Gly Thr Asp Asp Arg Val Thr Trp Va - #l Lys Ser Val Asp Glu 65 - # 70 - # 75 - # 80 - - Ala Ile Ala Ala Cys Gly Asp Val Pro Glu Il - #e Met Val Ile Gly Gly 85 - # 90 - # 95 - - Gly Arg Val Tyr Glu Gln Phe Leu Pro Lys Al - #a Gln Lys Leu Tyr Leu

Detailed Description Paragraph Table (7):

100 - # 105 - # 110 - - Thr His Ile Asp Ala Glu Val Glu Gly Asp Th - #r His Phe Pro Asp Tyr 115 - # 120 - # 125 - - Glu Pro Asp Asp Trp Glu Ser Val Phe Ser Gl - #u Phe His Asp Ala Asp 130 - # 135 - # 140 - - Ala Gln Asn Ser His Ser Tyr Glu Phe Glu Il - #e Leu Glu Arg Arg Ile 145 1 - #50 1 - #55 1 - #60 - - Leu Met Ser Ile Ser Ser Ser Ser Ser Gly Pro As - #p Asn Gln Lys Asn Ile 165 - # 170 - # 175 - - Met Ser Gln Val Leu Thr Ser Thr Pro Gln Gl - #y Val Pro Gln Gln Asp 180 - # 185 - # 190 - - Lys Leu Ser Gly Asn Glu Thr Lys Gln Ile Gl - #n Gln Thr Arg Gln Gly 195 - # 200 - # 205 - - Lys Asn Thr Glu Met Glu Ser Asp Ala Thr Il - #e Ala Gly Ala Ser Gly 210 - # 215 - # 220 - - Lys Asp Lys Thr Ser Ser Thr Thr Lys Thr Gl - #u Thr Ala Pro Gln Gln 225 2 - #30 2 - #35 2 - #40 - - Gly Val Ala Ala Gly Lys Glu Ser Ser Glu Se - #r Gln Lys Ala Gly Ala 245 - # 250 - # 255 - - Asp Thr Gly Val Ser Gly Ala Ala Ala Thr Th - #r Ala Ser Asn Thr Ala 260 - # 265 - # 270 - - Thr Lys Ile Ala Met Gln Thr Ser Ile Glu Gl - #u Ala Ser Lys Ser Met 275 - # 280 - # 285 - - Glu Ser Thr Leu Glu Ser Leu Gln Ser Leu Se - #r Ala Ala Gln Met Lys 290 - # 295 - # 300 - - Glu Val Glu Ala Val Val Val Ala Ala Leu Se - #r Gly Lys Ser Ser Gly 305 3 - #10 3 - #15 3 - #20 - - Ser Ala Lys Leu Glu Thr Pro Glu Leu Pro Ly - #s Pro Gly Val Thr Pro 325 - # 330 - # 335 - - Arg Ser Glu Val Ile Glu Ile Gly Leu Ala Le - #u Ala Lys Ala Ile Gln 340 - # 345 - # 350 - - Thr Leu Gly Glu Ala Thr Lys Ser Ala Leu Se - #r Asn Tyr Ala Ser Thr 355 - # 360 - # 365 - - Gln Ala Gln Ala Asp Gln Thr Asn Lys Leu Gl - #y Leu Glu Lys Gln Ala 370 - # 375 - # 380 - - Ile Lys Ile Asp Lys Glu Arg Glu Glu Tyr Gl - #n Glu Met Lys Ala Ala 385 3 - #90 3 - #95 4 - #00 - - Glu Gln Lys Ser Lys Asp Leu Glu Gly Thr Me - #t Asp Thr Val Asn Thr 405 - # 410 - # 415 - - Val Met Ile Ala Lys Gly Phe Glu Leu Pro Tr - #p Gly Pro Leu Ile Asn 420 - # 425 - # 430 - - - - (2) INFORMATION FOR SEQ ID NO:17: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:1947 base pa - #irs (B) TYPE: nucleic acid (C) STRANDEDNESS: double (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:17: - - ATG ATC AGT CTG ATT GCG GCG TTA GCG GTA GA - #T CGC GTT ATC GGC ATG 48 Met Ile Ser Leu Ile Ala Ala Leu Ala Val As - #p Arg Val Ile Gly Met 1 5 - # 10 - # 15 - - GAA AAC GCC ATG CCG TGG AAC CTG CCT GCC GA - #T CTC GCC TGG TTT AAA 96 Glu Asn Ala Met Pro Trp Asn Leu Pro Ala As - #p Leu Ala Trp Phe Lys 20 - # 25 - # 30 - - CGC AAC ACC TTA AAT AAA CCC GTG ATT ATG GG - #C CGC CAT ACC TGG GAA 144 Arg Asn Thr Leu Asn Lys Pro Val Ile Met Gl - #y Arg His Thr Trp Glu 35 - # 40 - # 45 - - TCA ATC GGT CGT CCG TTG CCA GGA CGC AAA AA - #T ATT ATC CTC AGC AGT 192 Ser Ile Gly Arg Pro Leu Pro Gly Arg Lys As - #n Ile Ile Leu Ser Ser 50 - # 55 - # 60 - - CAA CCG GGT ACG GAC GAT CGC GTA ACG TGG GT - #G AAG TCG GTG GAT GAA 240 Gln Pro Gly Thr Asp Asp Arg Val Thr Trp Va - #l Lys Ser Val Asp Glu 65 - # 70 - # 75 - # 80 - - GCC ATC GCG GCG TGT GGT GAC GTA CCA GAA AT - #C ATG GTG ATT GGC GGC 288 Ala Ile Ala Ala Cys Gly Asp Val Pro Glu Il - #e Met Val Ile Gly Gly 85 - # 90 - # 95 - - GGT CGC GTT TAT GAA CAG TTC TTG CCA AAA GC - #G CAA AAA CTG TAT CTG 336 Gly Arg Val Tyr Glu Gln Phe Leu Pro Lys Al - #a Gln Lys Leu Tyr Leu 100 - # 105 - # 110 - - ACG CAT ATC GAC GCA GAA GTG GAA GGC GAC AC - #C CAT TTC CCG GAT TAC 384 Thr His Ile Asp Ala Glu Val Glu Gly Asp Th - #r His Phe Pro Asp Tyr 115 - # 120 - # 125 - - GAG CCG

GAT GAC TGG GAA TCG GTA TTC AGC GA - #A TTC CAC GAT GCT GAT 432 Glu Pro Asp Asp Trp
Glu Ser Val Phe Ser Gl - #u Phe His Asp Ala Asp 130 - # 135 - # 140 - - GCG CAG AAC
TCT CAC AGC TAT GAG TTC GAA AT - #T CTG GAG CGG CGG ATC 480 Ala Gln Asn Ser His Ser
Tyr Glu Phe Glu Il - #e Leu Glu Arg Arg Ile 145 1 - #50 1 - #55 1 - #60 - - CTG ATG
TCT ATT TCA TCT TCT TCA GGA CCT GA - #C AAT CAA AAA AAT ATC 528 Leu Met Ser Ile Ser
Ser Ser Ser Gly Pro As - #p Asn Gln Lys Asn Ile 165 - # 170 - # 175 - - ATG TCT CAA
GTT CTG ACA TCG ACA CCC CAG GG - #C GTG CCC CAA CAA GAT 576 Met Ser Gln Val Leu Thr
Ser Thr Pro Gln Gl - #y Val Pro Gln Gln Asp 180 - # 185 - # 190 - - AAG CTG TCT GGC
AAC GAA ACG AAG CAA ATA CA - #G CAA ACA CGT CAG GGT 624 Lys Leu Ser Gly Asn Glu Thr
Lys Gln Ile Gl - #n Gln Thr Arg Gln Gly 195 - # 200 - # 205 - - AAA AAC ACT GAG ATG
GAA AGC GAT GCC ACT AT - #T GCT GGT GCT TCT GGA 672 Lys Asn Thr Glu Met Glu Ser Asp
Ala Thr Il - #e Ala Gly Ala Ser Gly 210 - # 215 - # 220 - - AAA GAC AAA ACT TCC TCG
ACT ACA AAA ACA GA - #A ACA GCT CCA CAA CAG 720 Lys Asp Lys Thr Ser Ser Thr Thr Lys
Thr Gl - #u Thr Ala Pro Gln Gln 225 2 - #30 2 - #35 2 - #40 - - GGA GTT GCT GCT GGG
AAA GAA TCC TCA GAA AG - #T CAA AAG GCA GGT GCT 768 Gly Val Ala Ala Gly Lys Glu Ser
Ser Glu Se - #r Gln Lys Ala Gly Ala 245 - # 250 - # 255 - - GAT ACT GGA GTA TCA GGA
GCG GCT GCT ACT AC - #A GCA TCA AAT ACT GCA 816 Asp Thr Gly Val Ser Gly Ala Ala Ala
Thr Th - #r Ala Ser Asn Thr Ala 260 - # 265 - # 270 - - ACA AAA ATT GCT ATG CAG ACC
TCT ATT GAA GA - #G GCG AGC AAA AGT ATG 864 Thr Lys Ile Ala Met Gln Thr Ser Ile Glu Gl
- #u Ala Ser Lys Ser Met 275 - # 280 - # 285 - - GAG TCT ACC TTA GAG TCA CTT CAA AGC
CTC AG - #T GCC GCG CAA ATG AAA 912 Glu Ser Thr Leu Glu Ser Leu Gln Ser Leu Se - #r
Ala Ala Gln Met Lys 290 - # 295 - # 300 - - GAA GTC GAA GCG GTT GTT GTT GCT GCC CTC TC
- #A GGG AAA AGT TCG GGT 960 Glu Val Glu Ala Val Val Val Ala Ala Leu Se - #r Gly Lys
Ser Ser Gly 305 3 - #10 3 - #15 3 - #20 - - TCC GCA AAA TTG GAA ACA CCT GAG CTC CCC AA
- #G CCC GGG GTG ACA CCA 1008 Ser Ala Lys Leu Glu Thr Pro Glu Leu Pro Ly - #s Pro Gly
Val Thr Pro 325 - # 330 - # 335 - - AGA TCA GAG GTT ATC GAA ATC GGA CTC GCG CT - #T
GCT AAA GCA ATT CAG 1056 Arg Ser Glu Val Ile Glu Ile Gly Leu Ala Le - #u Ala Lys Ala
Ile Gln 340 - # 345 - # 350 - - ACA TTG GGA GAA GCC ACA AAA TCT GCC TTA TC - #T AAC
TAT GCA AGT ACA 1104 Thr Leu Gly Glu Ala Thr Lys Ser Ala Leu Se - #r Asn Tyr Ala Ser
Thr 355 - # 360 - # 365 - - CAA GCA CAA GCA GAC CAA ACA AAT AAA CTA GG - #T CTA GAA
AAG CAA GCG 1152 Gln Ala Gln Ala Asp Gln Thr Asn Lys Leu Gl - #y Leu Glu Lys Gln Ala
370 - # 375 - # 380 - - ATA AAA ATC GAT AAA GAA CGA GAA GAA TAC CA - #A GAG ATG AAG
GCT GCC 1200 Ile Lys Ile Asp Lys Glu Arg Glu Glu Tyr Gl - #n Glu Met Lys Ala Ala 385 3
- #90 3 - #95 4 - #00 - - GAA CAG AAG TCT AAA GAT CTC GAA GGA ACA AT - #G GAT ACT GTC
AAT ACT 1248 Glu Gln Lys Ser Lys Asp Leu Glu Gly Thr Me - #t Asp Thr Val Asn Thr 405 -
410 - # 415 - - GTG ATG ATC GCG GTT TCT GTT GCC ATT ACA GT - #T ATT TCT ATT GTT GCT
1296 Val Met Ile Ala Val Ser Val Ala Ile Thr Va - #l Ile Ser Ile Val Ala 420 - # 425 -
430 - - GCT ATT TTT ACA TGC GGA GCT GGA CTC GCT GG - #A CTC GCT GCG GGA GCT 1344 Ala
Ile Phe Thr Cys Gly Ala Gly Leu Ala Gl - #y Leu Ala Ala Gly Ala 435 - # 440 - # 445 -
- GCT GTA GGT GCA GCG GCA GCT GGA GGT GCA GC - #A GGA GCT GCT GCC GCA 1392 Ala Val Gly
Ala Ala Ala Ala Gly Gly Ala Al - #a Gly Ala Ala Ala Ala 450 - # 455 - # 460 - - ACC
ACG GTA GCA ACA CAA ATT ACA GTT CAA GC - #T GTT GTC CAA GCG GTG 1440 Thr Thr Val Ala
Thr Gln Ile Thr Val Gln Al - #a Val Val Gln Ala Val 465 4 - #70 4 - #75 4 - #80 - -
AAA CAA GCT GTT ATC ACA GCT GTC AGA CAA GC - #G ATC ACC GCG GCT ATA 1488 Lys Gln Ala
Val Ile Thr Ala Val Arg Gln Al - #a Ile Thr Ala Ala Ile 485 - # 490 - # 495 - - AAA
GCG GCT GTC AAA TCT GGA ATA AAA GCA TT - #T ATC AAA ACT TTA GTC 1536 Lys Ala Ala Val
Lys Ser Gly Ile Lys Ala Ph - #e Ile Lys Thr Leu Val 500 - # 505 - # 510 - - AAA GCG
ATT GCC AAA GCC ATT TCT AAA GGA AT - #C TCT AAG GTT TTC GCT 1584 Lys Ala Ile Ala Lys
Ala Ile Ser Lys Gly Il - #e Ser Lys Val Phe Ala 515 - # 520 - # 525 - - AAG GGA ACT
CAA ATG ATT GCG AAG AAC TTC CC - #C AAG CTC TCG AAA GTC 1632 Lys Gly Thr Gln Met Ile
Ala Lys Asn Phe Pr - #o Lys Leu Ser Lys Val 530 - # 535 - # 540 - - ATC TCG TCT CTT
ACC AGT AAA TGG GTC ACG GT - #T GGG GTT GGG GTT GTA 1680 Ile Ser Ser Leu Thr Ser Lys
Trp Val Thr Va - #l Gly Val Gly Val Val 545 5 - #50 5 - #55 5 - #60 - - GTT GCG GCG
CCT GCT CTC GGT AAA GGG ATT AT - #G CAA ATG CAG CTC TCG 1728 Val Ala Ala Pro Ala Leu
Gly Lys Gly Ile Me - #t Gln Met Gln Leu Ser 565 - # 570 - # 575 - - GAG ATG CAA CAA
AAC GTC GCT CAA TTT CAG AA - #A GAA GTC GGA AAA CTG 1776 Glu Met Gln Gln Asn Val Ala
Gln Phe Gln Ly - #s Glu Val Gly Lys Leu 580 - # 585 - # 590 - - CAG GCT GCG GCT GAT
ATG ATT TCT ATG TTC AC - #T CAA TTT TGG CAA CAG 1824 Gln Ala Ala Ala Asp Met Ile Ser
Met Phe Th - #r Gln Phe Trp Gln Gln 595 - # 600 - # 605 - - GCA AGT AAA ATT GCC TCA
AAA CAA ACA GGC GA - #G TCT AAT GAA ATG ACT 1872 Ala Ser Lys Ile Ala Ser Lys Gln Thr
Gly Gl - #u Ser Asn Glu Met Thr 610 - # 615 - # 620 - - CAA AAA GCT ACC AAG CTG GGC
GCT CAA ATC CT - #T AAA GCG TAT GCC GCA 1920 Gln Lys Ala Thr Lys Leu Gly Ala Gln Ile
Le - #u Lys Ala Tyr Ala Ala 625 6 - #30 6 - #35 6 - #40 - - ATC AGC GGA GCC ATC GCT
GGC GCA GCA - # - # 1947 Ile Ser Gly Ala Ile Ala Gly Ala Ala 645 - - - - (2)
INFORMATION FOR SEQ ID NO:18: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:1296 base

pa - #irs (B) TYPE: nucleic acid (C) STRANDEDNESS: double (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:18: - - ATG ATC AGT CTG ATT GCG GCG TTA GCG GTA GA - #T CGC GTT ATC GGC ATG 48 Met Ile Ser Leu Ile Ala Ala Leu Ala Val As - #p Arg Val Ile Gly Met

Detailed Description Paragraph Table (8):
1 5 - # 10 - # 15 - - GAA AAC GCC ATG CCG TGG AAC CTG CCT GCC GA - #T CTC GCC TGG TTT AAA 96 Glu Asn Ala Met Pro Trp Asn Leu Pro Ala As - #p Leu Ala Trp Phe Lys 20 - # 25 - # 30 - - CGC AAC ACC TTA AAT AAA CCC GTG ATT ATG GG - #C CGC CAT ACC TGG GAA 144 Arg Asn Thr Leu Asn Lys Pro Val Ile Met Gl - #y Arg His Thr Trp Glu 35 - # 40 - # 45 - - TCA ATC GGT CGT CCG TTG CCA GGA CGC AAA AA - #T ATT ATC CTC AGC AGT 192 Ser Ile Gly Arg Pro Leu Pro Gly Arg Lys As - #n Ile Ile Leu Ser Ser 50 - # 55 - # 60 - - CAA CCG GGT ACG GAC GAT CGC GTA ACG TGG GT - #G AAG TCG GTG GAT GAA 240 Gln Pro Gly Thr Asp Asp Arg Val Thr Trp Va - #l Lys Ser Val Asp Glu 65 - # 70 - # 75 - # 80 - - GCC ATC GCG GCG TGT GGT GAC GTA CCA GAA AT - #C ATG GTG ATT GGC GGC 288 Ala Ile Ala Ala Cys Gly Asp Val Pro Glu Il - #e Met Val Ile Gly Gly 85 - # 90 - # 95 - - GGT CGC GTT TAT GAA CAG TTC TTG CCA AAA GC - #G CAA AAA CTG TAT CTG 336 Gly Arg Val Tyr Glu Gln Phe Leu Pro Lys Al - #a Gln Lys Leu Tyr Leu 100 - # 105 - # 110 - - ACG CAT ATC GAC GCA GAA GTG GAA GGC GAC AC - #C CAT TTC CCG GAT TAC 384 Thr His Ile Asp Ala Glu Val Glu Gly Asp Th - #r His Phe Pro Asp Tyr 115 - # 120 - # 125 - - GAG CCG GAT GAC TGG GAA TCG GTA TTC AGC GA - #A TTC CAC GAT GCT GAT 432 Glu Pro Asp Asp Trp Glu Ser Val Phe Ser Gl - #u Phe His Asp Ala Asp 130 - # 135 - # 140 - - GCG CAG AAC TCT CAC AGC TAT GAG TTC GAA AT - #T CTG GAG CGG CGG ATC 480 Ala Gln Asn Ser His Ser Tyr Glu Phe Glu Il - #e Leu Glu Arg Arg Ile 145 1 - #50 1 - #55 1 - #60 - - CTG ATG TCT ATT TCA TCT TCT TCA GGA CCT GA - #C AAT CAA AAA AAT ATC 528 Leu Met Ser Ile Ser Ser Ser Ser Gly Pro As - #p Asn Gln Lys Asn Ile 165 - # 170 - # 175 - - ATG TCT CAA GTT CTG ACA TCG ACA CCC CAG GG - #C GTG CCC CAA CAA GAT 576 Met Ser Gln Val Leu Thr Ser Thr Pro Gln Gl - #y Val Pro Gln Gln Asp 180 - # 185 - # 190 - - AAG CTG TCT GGC AAC GAA ACG AAG CAA ATA CA - #G CAA ACA CGT CAG GGT 624 Lys Leu Ser Gly Asn Glu Thr Lys Gln Ile Gl - #n Gln Thr Arg Gln Gly 195 - # 200 - # 205 - - AAA AAC ACT GAG ATG GAA AGC GAT GCC ACT AT - #T GCT GGT GCT TCT GGA 672 Lys Asn Thr Glu Met Glu Ser Asp Ala Thr Il - #e Ala Gly Ala Ser Gly 210 - # 215 - # 220 - - AAA GAC AAA ACT TCC TCG ACT ACA AAA ACA GA - #A ACA GCT CCA CAA CAG 720 Lys Asp Lys Thr Ser Ser Thr Thr Lys Thr Gl - #u Thr Ala Pro Gln Gln 225 2 - #30 2 - #35 2 - #40 - - GGA GTT GCT GCT GGG AAA GAA TCC TCA GAA AG - #T CAA AAG GCA GGT GCT 768 Gly Val Ala Ala Gly Lys Glu Ser Ser Glu Se - #r Gln Lys Ala Gly Ala 245 - # 250 - # 255 - - GAT ACT GGA GTA TCA GGA GCG GCT GCT ACT AC - #A GCA TCA AAT ACT GCA 816 Asp Thr Gly Val Ser Gly Ala Ala Ala Thr Th - #r Ala Ser Asn Thr Ala 260 - # 265 - # 270 - - ACA AAA ATT GCT ATG CAG ACC TCT ATT GAA GA - #G GCG AGC AAA AGT ATG 864 Thr Lys Ile Ala Met Gln Thr Ser Ile Glu Gl - #u Ala Ser Lys Ser Met 275 - # 280 - # 285 - - GAG TCT ACC TTA GAG TCA CTT CAA AGC CTC AG - #T GCC GCG CAA ATG AAA 912 Glu Ser Thr Leu Glu Ser Leu Gln Ser Leu Se - #r Ala Ala Gln Met Lys 290 - # 295 - # 300 - - GAA GTC GAA GCG GTT GTT GTT GCT GCC CTC TC - #A GGG AAA AGT TCG GGT 960 Glu Val Glu Ala Val Val Val Ala Ala Leu Se - #r Gly Lys Ser Ser Gly 305 3 - #10 3 - #15 3 - #20 - - TCC GCA AAA TTG GAA ACA CCT GAG CTC CCC AA - #G CCC GGG GTG ACA CCA 1008 Ser Ala Lys Leu Glu Thr Pro Glu Leu Pro Ly - #s Pro Gly Val Thr Pro 325 - # 330 - # 335 - - AGA TCA GAG GTT ATC GAA ATC GGA CTC GCG CT - #T GCT AAA GCA ATT CAG 1056 Arg Ser Glu Val Ile Glu Ile Gly Leu Ala Le - #u Ala Lys Ala Ile Gln 340 - # 345 - # 350 - - ACA TTG GGA GAA GCC ACA AAA TCT GCC TTA TC - #T AAC TAT GCA AGT ACA 1104 Thr Leu Gly Glu Ala Thr Lys Ser Ala Leu Se - #r Asn Tyr Ala Ser Thr 355 - # 360 - # 365 - - CAA GCA CAA GCA GAC CAA ACA AAT AAA CTA GG - #T CTA GAA AAG CAA GCG 1152 Gln Ala Gln Ala Asp Gln Thr Asn Lys Leu Gl - #y Leu Glu Lys Gln Ala 370 - # 375 - # 380 - - ATA AAA ATC GAT AAA GAA CGA GAA GAA TAC CA - #A GAG ATG AAG GCT GCC 1200 Ile Lys Ile Asp Lys Glu Arg Glu Glu Tyr Gl - #n Glu Met Lys Ala Ala 385 3 - #90 3 - #95 4 - #00 - - GAA CAG AAG TCT AAA GAT CTC GAA GGA ACA AT - #G GAT ACT GTC AAT ACT 1248 Glu Gln Lys Ser Lys Asp Leu Glu Gly Thr Me - #t Asp Thr Val Asn Thr 405 - # 410 - # 415 - - GTG ATG ATC GCG AAG GGG TTC GAA TTG CCA TG - #G GGG CCC TTA ATT AAT 1296 Val Met Ile Ala Lys Gly Phe Glu Leu Pro Tr - #p Gly Pro Leu Ile Asn 420 - # 425 - # 430 - - - - (2) INFORMATION FOR SEQ ID NO:19: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:20 base pair - #s (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:19: - - AGCTGTCTGG CAACGAAACG - # - # - # 20 - - - - (2) INFORMATION FOR SEQ ID NO:20: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:20 base pair - #s (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:20: - - GCAGCAACAA CAACCGCTTC - # - # - # 20 - - - - (2)

INFORMATION FOR SEQ ID NO:21: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:29 base pair - #s (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:21: - - GATCCTGATG TCTATTTCAT CTTCTTCAG - # - # 29 - - - - (2)
INFORMATION FOR SEQ ID NO:22: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:28 base pair - #s (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:22: - - GTCCTGAAGA AGATGAAATA GACATCAG - # - # 28 - - - - (2)
INFORMATION FOR SEQ ID NO:23: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:30 base pair - #s (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:23: - - AATTGCCATG GGGGCCCTTA ATTAATTAAC - # - # 30 - - - - (2)
INFORMATION FOR SEQ ID NO:24: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:30 base pair - #s (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:24: - - TCGAGTTAAT TAATTAAGGG CCCCCATGGC - # - # 30 - - - - (2)
INFORMATION FOR SEQ ID NO:25: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH:5438 base pa - #irs (B) TYPE: nucleic acid (C) STRANDEDNESS: double (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Plasmid - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:25: - - ATCGATGTTA ACAGATCTAA GCTTAACTAA CTAACTCCGG AAAAGGAGGA AC - #TTCCATGA 60
- - TCAGTCTGAT TGCGGCGTTA GCGGTAGATC GCGTTATCGG CATGGAAAAC GC - #CATGCCGT 120 - -
GGAACCTGCC TGCCGATCTC GCCTGGTTTA AACGCAACAC CTTAAATAAA CC - #CGTGATTA 180 - -
TGGGCCGCCA TACCTGGGAA TCAATCGGTC GTCCGTTGCC AGGACGCAAA AA - #TATTATCC 240 - -
TCAGCAGTCA ACCGGGTACG GACGATCGCG TAACGTGGGT GAAGTCGGTG GA - #TGAAGCCA 300 - -
TCGCGGCGTG TGGTGACGTA CCAGAAATCA TGGTGATTGG CGGCGGTCGC GT - #TTATGAAC 360 - -
AGTTCTTGCC AAAAGCGCAA AAACTGTATC TGACGCATAT CGACGCAGAA GT - #GGAAGGCG 420 - -
ACACCCATTT CCCGGATTAC GAGCCGGATG ACTGGGAATC GGTATTCAGC GA - #ATTCCACG 480 - -
ATGCTGATGC GCAGAACTCT CACAGCTATG AGTTCGAAAT TCTGGAGCGG CG - #GATCCTGA 540 - -
TGTCTATTTC ATCTTCTTCA GGACCTGACA ATCAAAAAAA TATCATGTCT CA - #AGTTCTGA 600 - -
CATCGACACC CCAGGGCGTG CCCCAACAAG ATAAGCTGTC TGGCAACGAA AC - #GAAGCAAA 660 - -
TACAGCAAAC ACGTCAGGGT AAAAACACTG AGATGGAAAG CGATGCCACT AT - #TGCTGGTG 720 - -
CTTCTGGAAA AGACAAAACT TCCTCGACTA CAAAAACAGA AACAGCTCCA CA - #ACAGGGAG 780 - -
TTGCTGCTGG GAAAGAATCC TCAGAAAGTC AAAAGGCAGG TGCTGATACT GG - #AGTATCAG 840 - -
GAGCGGCTGC TACTACAGCA TCAAATACTG CAACAAAAAT TGCTATGCAG AC - #CTCTATTG 900 - -
AAGAGGCGAG CAAAAGTATG GAGTCTACCT TAGAGTCACT TCAAAGCCTC AG - #TGCCGCGC 960 - -
AAATGAAAGA AGTCGAAGCG GTTGTTGTTG CTGCCCTCTC AGGGAAAAGT TC - #GGGTTCCG 1020 - -
CAAAATTGGA AACACCTGAG CTCCCCAAGC CCGGGGTGAC ACCAAGATCA GA - #GGTTATCG 1080 - -
AAATCGGACT CGCGCTTGCT AAAGCAATTC AGACATTGGG AGAAGCCACA AA - #ATCTGCCT 1140 - -
TATCTAACTA TGCAAGTACA CAAGCACAAG CAGACCAAAC AAATAAACTA GG - #TCTAGAAA 1200 - -
AGCAAGCGAT AAAAATCGAT AAAGAACGAG AAGAATACCA AGAGATGAAG GC - #TGCCGAAC 1260 - -
AGAAGTCTAA AGATCTCGAA GGAACAATGG ATACTGTCAA TACTGTGATG AT - #CGCGAAGG 1320 - -
GGTTCGAATT GCCATGGGGG CCCTTAATTA ATTAACTCGA GAGATCCAGA TC - #TAATCGAT 1380 - -
GATCCTCTAC GCCGGACGCA TCGTGGCCGG CATCACCGGC GCCACAGGTG CG - #GTTGCTGG 1440 - -
CGCCTATATC GCCGACATCA CCGATGGGGA AGATCGGGCT CGCCACTTCG GG - #CTCATGAG 1500 - -
CGCTTGTTTC GGCGTGGGTA TGGTGGCAGG CCCGTGGCCG GGGGACTGTT GG - #GCGCCATC 1560 - -
TCCTTGCATG CACCATTCCT TGCGGCGGCG GTGCTCAACG GCCTCAACCT AC - #TACTGGGC 1620 - -
TGCTTCCTAA TGCAGGAGTC GCATAAGGGA GAGCGTCGAC CGATGCCCTT GA - #GAGCCTTC 1680 - -
AACCCAGTCA GCTCCTTCCG GTGGGCGCGG GGCATGACTA TCGTCGCCGC AC - #TTATGACT 1740 - -
GTCTTCTTTA TCATGCAACT CGTAGGACAG GTGCCGGCAG CGCTCTGGGT CA - #TTTTCGGC 1800 - -
GAGGACCGCT TTCGCTGGAG CGCGACGATG ATCGGCCTGT CGCTTGCGGT AT - #TCGGAATC 1860 - -
TTGCACGCCC TCGCTCAAGC CTTCGTCACT GGTCCCGCCA CCAAACGTTT CG - #GCGAGAAG 1920 - -
CAGGCCATTA TCGCCGGCAT GGCGGCCGAC GCGCTGGGCT ACGTCTTGCT GG - #CGTTCGCG 1980 - -
ACGCGAGGCT GGATGGCCTT CCCCATTATG ATTCTTCTCG CTTCCGGCGG CA - #TCGGGATG 2040 - -
CCCGCGTTGC AGGCCATGCT GTCCAGGCAG GTAGATGACG ACCATCAGGG AC - #AGCTTCAA 2100 - -
GGATCGCTCG CGGCTCTTAC CAGCCTAACT TCGATCACTG GACCGCTGAT CG - #TCACGGCG 2160 - -
ATTTATGCCG CCTCGGCGAG CACATGGAAC GGGTTGGCAT GGATTGTAGG CG - #CCGCCCTA 2220 - -
TACCTTGTCT GCCTCCCCGC GTTGCGTCGC GGTGCATGGA GCCGGGCCAC CT - #CGACCTGA 2280 - -
ATGGAAGCCG GCGGCACCTC GCTAACGGAT TCACCACTCC AAGAATTGGA GC - #CAATCAAT 2340

Detailed Description Paragraph Table (9):
- - TCTTGCGGAG AACTGTGAAT GCGCAAACCA ACCCTTGGCA GAACATATCC AT - #CGCGTCCG 2400 - -
CCATCTCCAG CAGCCGCACG CGGCGCATCT CGGGCAGCGT TGGGTCCTGG CC - #ACGGGTGC 2460 - -
GCATGATCGT GCTCCTGTCG TTGAGGACCC GGCTAGGCTG GCGGGGTTGC CT - #TACTGGTT 2520 - -
AGCAGAATGA ATCACCGATA CGCGAGCGAA CGTGAAGCGA CTGCTGCTGC AA - #AACGTCTG 2580 - -
CGACCTGAGC AACAACATGA ATGGTCTTCG GTTTCCGTGT TTCGTAAAGT CT - #GGAAACGC 2640 - -

GGAAGTCAGC GCCCTGCACC ATTATGTTCC GGATCTGCAT CGCAGGATGC TG - #CTGGCTAC 2700 - -
CCTGTGGAAC ACCTACATCT GTATTAACGA AGCGCTGGCA TTGACCCTGA GT - #GATTTTTC 2760 - -
TCTGGTCCCG CCGCATCCAT ACCGCCAGTT GTTTACCCTC ACAACGTTCC AG - #TAACCGGG 2820 - -
CATGTTCATC ATCAGTAACC CGTATCGTGA GCATCCTCTC TCGTTTCATC GG - #TATCATTA 2880 - -
CCCCCATGAA CAGAAATTCC CCCTTACACG GAGGCATCAA GTGACCAAAC AG - #GAAAAAAC 2940 - -
CGCCCTTAAC ATGGCCCGCT TTATCAGAAG CCAGACATTA ACGCTTCTGG AG - #AAACTCAA 3000 - -
CGAGCTGGAC GCGGATGAAC AGGCAGACAT CTGTGAATCG CTTCACGACC AC - #GCTGATGA 3060 - -
GCTTTACCGC AGCTGCCTCG CGCGTTTCGG TGATGACGGT GAAAACCTCT GA - #CACATGCA 3120 - -
GCTCCCGGAG ACGGTCACAG CTTGTCTGTA AGCGGATGCC GGGAGCAGAC AA - #GCCCGTCA 3180 - -
GGGCGCGTCA GCGGGTGTTG GCGGGTGTCG GGGCGCAGCC ATGACCCAGT CA - #CGTAGCGA 3240 - -
TAGCGGAGTG TATACTGGCT TAACTATGCG GCATCAGAGC AGATTGTACT GA - #GAGTGCAC 3300 - -
CATATGCGGT GTGAAATACC GCACAGATGC GTAAGGAGAA AATACCGCAT CA - #GGCGCTCT 3360 - -
TCCGCTTCCT CGCTCACTGA CTCGCTGCGC TCGGTCGTTC GGCTGCGGCG AG - #CGGTATCA 3420 - -
GCTCACTCAA AGGCGGTAAT ACGGTTATCC ACAGAATCAG GGGATAACGC AG - #GAAAGAAC 3480 - -
ATGTGAGCAA AAGGCCAGCA AAAGGCCAGG AACCGTAAAA AGGCCGCGTT GC - #TGGCGTTT 3540 - -
TTCCATAGGC TCCGCCCCCC TGACGAGCAT CACAAAAATC GACGCTCAAG TC - #AGAGGTGG 3600 - -
CGAAACCCGA CAGGACTATA AAGATACCAG GCGTTTCCCC CTGGAAGCTC CC - #TCGTGCGC 3660 - -
TCTCCTGTTC CGACCCTGCC GCTTACCGGA TACCTGTCCG CCTTTCTCCC TT - #CGGGAAGC 3720 - -
GTGGCGCTTT CTCAATGCTC ACGCTGTAGG TATCTCAGTT CGGTGTAGGT CG - #TTCGCTCC 3780 - -
AAGCTGGGCT GTGTGCACGA ACCCCCCGTT CAGCCCGACC GCTGCGCCTT AT - #CCGGTAAC 3840 - -
TATCGTCTTG AGTCCAACCC GGTAAGACAC GACTTATCGC CACTGGCAGC AG - #CCACTGGT 3900 - -
AACAGGATTA GCAGAGCGAG GTATGTAGGC GGTGCTACAG AGTTCTTGAA GT - #GGTGGCCT 3960 - -
AACTACGGCT ACACTAGAAG GACAGTATTT GGTATCTGCG CTCTGCTGAA GC - #CAGTTACC 4020 - -
TTCGGAAAAA GAGTTGGTAG CTCTTGATCC GGCAAACAAA CCACCGCTGG TA - #GCGGTGGT 4080 - -
TTTTTTGTTT GCAAGCAGCA GATTACGCGC AGAAAAAAAG GATCTCAAGA AG - #ATCCTTTG 4140 - -
ATCTTTTCTA CGGGGTCTGA CGCTCAGTGG AACGAAAACT CACGTTAAGG GA - #TTTTGGTC 4200 - -
ATGAGATTAT CAAAAAGGAT CTTCACCTAG ATCCTTTTAA ATTAAAAATG AA - #GTTTTAAA 4260 - -
TCAATCTAAA GTATATATGA GTAAACTTGG TCTGACAGTT ACCAATGCTT AA - #TCAGTGAG 4320 - -
GCACCTATCT CAGCGATCTG TCTATTTCGT TCATCCATAG TTGCCTGACT CC - #CCGTCGTG 4380 - -
TAGATAACTA CGATACGGGA GGGCTTACCA TCTGGCCCCA GTGCTGCAAT GA - #TACCGCGA 4440 - -
GACCCACGCT CACCGGCTCC AGATTTATCA GCAATAAACC AGCCAGCCGG AA - #GGGCCGAG 4500 - -
CGCAGAAGTG GTCCTGCAAC TTTATCCGCC TCCATCCAGT CTATTAATTG TT - #GCCGGGAA 4560 - -
GCTAGAGTAA GTAGTTCGCC AGTTAATAGT TTGCGCAACG TTGTTGCCAT TG - #CTGCAGGC 4620 - -
ATCGTGGTGT CACGCTCGTC GTTTGGTATG GCTTCATTCA GCTCCGGTTC CC - #AACGATCA 4680 - -
AGGCGAGTTA CATGATCCCC CATGTTGTGC AAAAAAGCGG TTAGCTCCTT CG - #GTCCTCCG 4740 - -
ATCGTTGTCA GAAGTAAGTT GGCCGCAGTG TTATCACTCA TGGTTATGGC AG - #CACTGCAT 4800 - -
AATTCTCTTA CTGTCATGCC ATCCGTAAGA TGCTTTTCTG TGACTGGTGA GT - #ACTCAACC 4860 - -
AAGTCATTCT GAGAATAGTG TATGCGGCGA CCGAGTTGCT CTTGCCCGGC GT - #CAACACGG 4920 - -
GATAATACCG CGCCACATAG CAGAACTTTA AAAGTGCTCA TCATTGGAAA AC - #GTTCTTCG 4980 - -
GGGCGAAAAC TCTCAAGGAT CTTACCGCTG TTGAGATCCA GTTCGATGTA AC - #CCACTCGT 5040 - -
GCACCCAACT GATCTTCAGC ATCTTTTACT TTCACCAGCG TTTCTGGGTG AG - #CAAAAACA 5100 - -
GGAAGGCAAA ATGCCGCAAA AAAGGGAATA AGGGCGACAC GGAAATGTTG AA - #TACTCATA 5160 - -
CTCTTCCTTT TTCAATATTA TTGAAGCATT TATCAGGGTT ATTGTCTCAT GA - #GCGGATAC 5220 - -
ATATTTGAAT GTATTTAGAA AAATAAACAA ATAGGGGTTC CGCGCACATT TC - #CCCGAAAA 5280 - -
GTGCCACCTG ACGTCTAAGA AACCATTATT ATCATGACAT TAACCTATAA AA - #ATAGGCGT 5340 - -
ATCACGAGGC CCTTTCGTCT TCAAGAATTA ATTGTTATCC GCTCACAATT AA - #TTCTTGAC 5400 - -
AATTAGTTAA CTATTTGTTA TAATGTATTC ATAAGCTT - # - # 5438 - - - - (2) INFORMATION FOR SEQ ID NO:26: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH: 20 base - #pairs (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:26: - - GCTGCCGAAC AGAAGTCTAA - # - # - # 20 - - - - (2) INFORMATION FOR SEQ ID NO:27: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH: 20 base - #pairs (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:27: - - CTCGAAGGAA CAATGGATAC - # - # - # 20 - - - - (2) INFORMATION FOR SEQ ID NO:28: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH: 23 base - #pairs (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:28: - - GTACATATTG TCGTTAGAAC GCG - # - # 23 - - - - (2) INFORMATION FOR SEQ ID NO:29: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH: 23 base - #pairs (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:29: - - TAATACGACT CACTATAGGG AGA - # - # 23 - - - - (2) INFORMATION FOR SEQ ID NO:30: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH: 28 base - #pairs (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ

ID NO:30: - - GCGGATCCTG ATGTCTATTT CATCTTCT - # - # 28 - - - - (2) INFORMATION FOR SEQ ID NO:31: - - (i) SEQUENCE CHARACTERISTICS: (A) LENGTH: 30 base - #pairs (B) TYPE: nucleic acid (C) STRANDEDNESS: single (D) TOPOLOGY: linear - - (ii) MOLECULE TYPE: Other nucleic acid; - #Synthetic DNA - - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:31: - - ATCTCGAGTT TTATGCTGCT GCGCCAGCGA - # - # 30

Other Reference Publication (12):
Freidank et al.,"Identification of Chlamydia pneumoniae-specific protein antigens in immunoblots" Clinical Microbiology and Infectious Disease, 1993, vol. 12, No. 12, pp. 947-951, abstract, table 1, Fig. 1; p. 950, right column; p. 951, left column.

Other Reference Publication (13):
Melgosa et al., "Isolation and characterization of a gene encoding a Chlamydia pneumoniae 76-kilodalton protein containing a species-specific epitope" Infection and Immunity, 1994, vol. 62, No. 3, pp. 880-886.

Other Reference Publication (14):
Tong et al., "Detection of Chlamydia peumoniae and Chlamydia psittaci in sputum samples by PCR" Journal of Clinical Pathology, 1993, vol. 46, pp. 313-317.

Other Reference Publication (15):
Tjhie et al., "Detection of Chlamydia pneumoniae using a general Chlamydia polymerase chain reaction with species differentiation after hybridisation", Journal of Microbiological Methods, 1993, vol. 18, pp. 137-150.

CLAIMS:

1. A purified, isolated or synthesized DNA encoding a Chlamydia pneumoniae antigenic polypeptide, or a purified, isolated or synthesized DNA complimentary and identical in length thereto, wherein said polypeptide consists of a polypeptide A containing a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO: 1.

2. The purified, isolated or synthesized DNA of claim 1, which consists of the base sequence of SEQ ID NO: 3.

3. The purified, isolated or synthesized DNA of claim 1, which consists of the base sequence of SEQ ID NO: 4.

4. The purified, isolated or synthesized DNA of claim 1, which consists of the base sequence of SEQ ID NO: 7.

6. A Recombinant vector of claim 5, which consists of the base sequence of SEQ ID NO: 10.

17. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 1, wherein said polypeptide A is a polypeptide in which an amino acid or a peptide sequence is bound to a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO:1.

18. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 1, wherein said polypeptide A is a polypeptide containing the amino acid sequence of SEQ ID NO:1.

19. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 1, wherein said polypeptide A is a polypeptide containing the amino acid sequence of SEQ ID NO:2.

20. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 1, wherein said polypeptide A is a polypeptide containing the amino acid sequence of SEQ ID NO:5.

21. A purified, isolated or synthesized DNA encoding a fused protein of a Chlamydia pneumoniae antigenic polypeptide with dihydrofolate reductase or a purified, isolated or synthesized DNA complimentary and identical in length thereto, in which a

polypeptide B containing a sequence of at least 5 consecutive amino acids in the polypeptide of SEQ ID NO:1 is bound to the polypeptide of SEQ ID NO:14 either directly or via an intervening amino acid or amino acid sequence.

22. The purified, isolated or synthesized DNA of claim 21, which consists of the base sequence of SEQ ID NO: 17.

23. The purified, isolated or synthesized DNA of claim 21, which consists of the base sequence of SEQ ID NO: 18.

34. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 21, wherein the fused protein is a polypeptide containing the amino acid sequence of SEQ ID NO:15.

35. The purified, isolated or synthesized DNA or the purified, isolated or synthesized DNA complementary and identical in length thereto of claim 21, wherein the fused protein is a polypeptide containing the amino acid sequence of SEQ ID NO:16.

36. A probe for detection and/or measurement of a Chlamydia pneumoniae gene, which comprises any one of

(a) a purified, isolated or synthesized DNA consisting of a sequence of at least 10 consecutive bases in the DNA of SEQ ID NO: 3,

(b) a purified, isolated or synthesized DNA complementary and identical in length to DNA (a), or

(c) a purified, isolated or synthesized DNA having at least 90% homology to DNA (a) or (b).

37. The probe of claim 35, which consists of the base sequence of SEQ ID NO: 19.

38. The probe of claim 35, which consists of the base sequence of SEQ ID NO: 20.

39. A reagent for detection and/or measurement of a Chlamydia pneumoniae gene, which comprises the probe of any one of claims 36-38.

40. A reagent for diagnosis of a Chlamydia pneumoniae infection, which comprises the probe of any one of claims 36-38 as an active ingredient.

41. A primer for detection and/or measurement of a Chlamydia pneumoniae gene, which comprises any one of

(a) a purified, isolated or synthesized DNA consisting of a sequence of at least 10 consecutive bases in the DNA of SEQ ID NO: 3,

(b) a purified, isolated or synthesized DNA complementary and identical in length to DNA (a), or

(c) a purified, isolated or synthesized DNA having at least 90% homology to DNA (a) or (b).

42. The primer of claim 40, which consists of the base sequence of SEQ ID NO: 19.

43. The primer of claim 40, which consists of the base sequence of SEQ ID NO: 20.

44. A reagent for detection and/or measurement of a Chlamydia pneumoniae gene, which comprises the primer of any one of claims 40-42.

45. A reagent for diagnosis of a Chlamydia pneumoniae infection, which comprises the primer of any one of claims 40-42 as an active ingredient.

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Search Results - Record(s) 11 through 18 of 18 returned.

☐ 11. Document ID: US 6165478 A

L9: Entry 11 of 18 File: USPT Dec 26, 2000

US-PAT-NO: 6165478
DOCUMENT-IDENTIFIER: US 6165478 A

TITLE: DNA encoding Chlamydia pneumoniae antigenic polypeptide

DATE-ISSUED: December 26, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Izutsu; Hiroshi	Ibaraki			JPX
Obara; Kazuhiko	Ibaraki			JPX
Matsumoto; Akira	Okayama			JPX

US-CL-CURRENT: 424/263.1; 435/252.3, 435/320.1, 435/6, 435/69.1, 435/69.3, 435/7.36, 536/23.1, 536/23.4

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

☐ 12. Document ID: US 6018031 A

L9: Entry 12 of 18 File: USPT Jan 25, 2000

US-PAT-NO: 6018031
DOCUMENT-IDENTIFIER: US 6018031 A

TITLE: Binding agents specific for IgA receptor

DATE-ISSUED: January 25, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Shen; Lilian	Thetford Center	VT		
Fanger; Michael W.	Lebanon	NH		

US-CL-CURRENT: 530/387.3; 530/387.7, 530/388.2, 530/388.22

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

☐ 13. Document ID: US 5980861 A

L9: Entry 13 of 18 File: USPT Nov 9, 1999

US-PAT-NO: 5980861

DOCUMENT-IDENTIFIER: US 5980861 A

TITLE: Chelator compositions and methods of synthesis thereof

DATE-ISSUED: November 9, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hnatowich; Donald J.	Brookline	MA		
Rusckowski; Mary	Southborough	MA		
Mardirossian; George	Worcester	MA		
Winnard, Jr.; Paul	Holden	ME		
Chang; Fengchun	Worcester	MA		

US-CL-CURRENT: 424/1.69; 424/1.11, 424/1.65, 424/1.73, 530/331, 534/14

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 14. Document ID: US 5922845 A

L9: Entry 14 of 18 File: USPT Jul 13, 1999

US-PAT-NO: 5922845
DOCUMENT-IDENTIFIER: US 5922845 A

TITLE: Therapeutic multispecific compounds comprised of anti-Fc.alpha. receptor antibodies

DATE-ISSUED: July 13, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Deo; Yashwant M.	Audubon	PA		
Graziano; Robert	Frenchtown	NJ		
Keler; Tibor	Ottsville	PA		

US-CL-CURRENT: 530/387.3; 424/136.1, 424/184.1, 424/204.1, 424/234.1, 424/265.1, 424/274.1, 424/277.1, 435/69.7, 530/388.1, 530/395, 536/23.5

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 15. Document ID: US 5919620 A

L9: Entry 15 of 18 File: USPT Jul 6, 1999

US-PAT-NO: 5919620
DOCUMENT-IDENTIFIER: US 5919620 A

TITLE: Heat shock protein HSP72 of Streptococcus pneumoniae

DATE-ISSUED: July 6, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Brodeur; Bernard R.	Sillery			CAX
Martin; Denis	St.-Augustin			CAX
Hamel; Josee	Sillery			CAX

US-CL-CURRENT: 435/6; 435/4, 435/69.1, 435/963, 536/23.4, 536/23.7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 16. Document ID: US 5736343 A

L9: Entry 16 of 18 File: USPT Apr 7, 1998

US-PAT-NO: 5736343
DOCUMENT-IDENTIFIER: US 5736343 A

TITLE: Detection of organic compounds through regulation of antibody-catalyzed reactions

DATE-ISSUED: April 7, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Landry; Donald	New York	NY	10027	

US-CL-CURRENT: 435/7.6; 435/188.5

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 17. Document ID: US 5591628 A

L9: Entry 17 of 18 File: USPT Jan 7, 1997

US-PAT-NO: 5591628
DOCUMENT-IDENTIFIER: US 5591628 A

TITLE: Method of determining the presence of endotoxin in a sample

DATE-ISSUED: January 7, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
B.ae butted.k; Leif	2200 Copenhagen N			DKX
Koch; Claus	1415 Copenhagen			DKX

US-CL-CURRENT: 435/70.21; 435/7.1, 435/7.8, 435/7.92, 436/548, 530/388.1, 530/389.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 18. Document ID: US 5316911 A

L9: Entry 18 of 18 File: USPT May 31, 1994

US-PAT-NO: 5316911

DOCUMENT-IDENTIFIER: US 5316911 A

TITLE: Method of determining the presence of endotoxin in a sample

DATE-ISSUED: May 31, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Baek; Leif	2200 Copenhagen N			DKX
Koch; Claus	1415 Copenhagen K			DKX

US-CL-CURRENT: 435/7.9; 435/7.1, 435/7.2, 435/7.21, 435/7.93, 435/7.94

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments

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☐ 1. Document ID: US 6355254 B1

L12: Entry 1 of 21 File: USPT Mar 12, 2002

US-PAT-NO: 6355254
DOCUMENT-IDENTIFIER: US 6355254 B1

TITLE: Pathogenic Escherichia coli associated protein EspA

DATE-ISSUED: March 12, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Finlay; B. Brett	Richmond			CAX
Kenny; Brendan	Redland			GBX
Stein; Markus	Quercegrossa			ITX
Donnenberg; Michael S.	Baltimore	MD		
Lai; Li-Ching	Upper Arlington	OH		

US-CL-CURRENT: 424/241.1; 424/185.1, 424/190.1, 530/350

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

☐ 2. Document ID: US 6353093 B1

L12: Entry 2 of 21 File: USPT Mar 5, 2002

US-PAT-NO: 6353093
DOCUMENT-IDENTIFIER: US 6353093 B1

TITLE: gidB

DATE-ISSUED: March 5, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Burnham; Martin K R	Barto	PA		
Kallender; Howard	King of Prussia	PA		
Lenox; Anna Lisa	Doylestown	PA		
Ward; Judith	Dorking			GBX

US-CL-CURRENT: 530/350; 424/185.1, 424/190.1, 424/192.1, 424/234.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

☐ 3. Document ID: US 6340463 B1

L12: Entry 3 of 21 File: USPT Jan 22, 2002

US-PAT-NO: 6340463
DOCUMENT-IDENTIFIER: US 6340463 B1

TITLE: Identification of antigenic peptide sequences

DATE-ISSUED: January 22, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mitchell; William M.	Nashville	TN		
Stratton; Charles W.	Nashville	TN		

US-CL-CURRENT: 424/263.1; 424/130.1, 424/184.1, 424/185.1, 424/190.1, 424/191.1, 424/234.1, 424/278.1, 424/9.1, 424/9.2 , 435/243, 435/41, 530/300

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 4. Document ID: US 6312932 B1

L12: Entry 4 of 21 File: USPT Nov 6, 2001

US-PAT-NO: 6312932
DOCUMENT-IDENTIFIER: US 6312932 B1

TITLE: Yfil pseudouridine synthase

DATE-ISSUED: November 6, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Powell; David J.	Radnor	PA		

US-CL-CURRENT: 435/183; 424/185.1, 424/190.1, 435/233, 530/300, 530/350

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 5. Document ID: US 6307022 B1

L12: Entry 5 of 21 File: USPT Oct 23, 2001

US-PAT-NO: 6307022
DOCUMENT-IDENTIFIER: US 6307022 B1

TITLE: Def

DATE-ISSUED: October 23, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Lonetto; Michael Arthur	Collegeville	PA	19426	

US-CL-CURRENT: 530/350; 424/184.1, 424/185.1, 424/190.1, 424/192.1, 424/234.1, 424/263.1, 435/69.3, 435/69.7, 530/300, 530/324, 530/333

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

☐ 6. Document ID: US 6290970 B1

L12: Entry 6 of 21 File: USPT Sep 18, 2001

US-PAT-NO: 6290970
DOCUMENT-IDENTIFIER: US 6290970 B1

TITLE: Transferrin receptor protein of Moraxella

DATE-ISSUED: September 18, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Yang; Yan-Ping	Willowdale			CAX
Myers; Lisa E.	Guelph			CAX
Harkness; Robin E.	Willowdale			CAX
Klein; Michel H.	Willowdale			CAX

US-CL-CURRENT: 424/251.1; 424/184.1, 424/190.1, 424/234.1, 424/250.1, 514/2, 530/350, 530/412

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

☐ 7. Document ID: US 6228364 B1

L12: Entry 7 of 21 File: USPT May 8, 2001

US-PAT-NO: 6228364
DOCUMENT-IDENTIFIER: US 6228364 B1

TITLE: GidA1

DATE-ISSUED: May 8, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kallender; Howard	King of Prussia	PA		
Reichard; Raymond W.	Quakertown	PA		

US-CL-CURRENT: 424/190.1; 424/192.1, 424/193.1, 424/197.11, 424/234.1, 424/263.1, 530/350

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

☐ 8. Document ID: US 6217884 B1

L12: Entry 8 of 21 File: USPT Apr 17, 2001

US-PAT-NO: 6217884
DOCUMENT-IDENTIFIER: US 6217884 B1

TITLE: Streptococcus pneumoniae 37-kDa surface adhesin a protein

DATE-ISSUED: April 17, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sampson; Jacquelyn S.	College Park	GA		
Russell; Harold	Atlanta	GA		
Tharpe; Jean A.	Lithonia	GA		
Ades; Edwin W.	Atlanta	GA		
Carlone; George M.	Stone Mountain	GA		

US-CL-CURRENT: 424/244.1; 424/184.1, 424/190.1, 424/200.1, 435/69.1, 435/69.3, 435/71.1, 530/350, 536/23.7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 9. Document ID: US 6207162 B1

L12: Entry 9 of 21 File: USPT Mar 27, 2001

US-PAT-NO: 6207162
DOCUMENT-IDENTIFIER: US 6207162 B1

TITLE: AspS from Chlamydia trachomatis

DATE-ISSUED: March 27, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Brown; James R.	Berwyn	PA		
Lawlor; Elizabeth J	Malvern	PA		
Reichard; Raymond W	Quakertown	PA		

US-CL-CURRENT: 424/190.1; 424/185.1, 424/192.1, 435/183, 435/193, 514/2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 10. Document ID: US 6204003 B1

L12: Entry 10 of 21 File: USPT Mar 20, 2001

US-PAT-NO: 6204003
DOCUMENT-IDENTIFIER: US 6204003 B1

TITLE: Methods for the diagnosis of feline infectious anemia

DATE-ISSUED: March 20, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Steele; J. Kevin	San Diego	CA		
Telford; David L.	Carlsbad	CA		
Cutting; John A.	San Diego	CA		

US-CL-CURRENT: 435/7.32; 424/184.1, 424/190.1, 424/264.1, 435/243, 435/245, 435/252.1,

435/340, 435/351, 435/7.1, 435/7.2, 436/501, 436/512, 530/388.4

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 11. Document ID: US 6197300 B1

L12: Entry 11 of 21 File: USPT Mar 6, 2001

US-PAT-NO: 6197300
DOCUMENT-IDENTIFIER: US 6197300 B1

TITLE: ftsZ

DATE-ISSUED: March 6, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Fueyo; Joanna Lynn	Philadelphia	PA		
Lonetto; Michael Arthur	Collegeville	PA		

US-CL-CURRENT: 424/185.1; 424/190.1, 424/192.1, 424/234.1, 424/244.1, 530/350

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 12. Document ID: US 6168797 B1

L12: Entry 12 of 21 File: USPT Jan 2, 2001

US-PAT-NO: 6168797
DOCUMENT-IDENTIFIER: US 6168797 B1

TITLE: FabF

DATE-ISSUED: January 2, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Biswas; Sanjoy	Paoli	PA		
Burnham; Martin K R	Barto	PA		
Fedon; Jason C	Strafford	PA		
Holmes; David J	West Chester	PA		
Ingraham; Karen A	Auburn	PA		
Kallender; Howard	Wayne	PA		
Lonsdale; John T	Exton	PA		
Mazzulla; Marie J	Collegeville	PA		
O'Dwyer; Karen M	Phoenixville	PA		
Palmer; Leslie M	Audubon	PA		
So; Chi Young	Havertown	PA		
Traini; Christopher M	Media	PA		
Van Aller; Glenn S	Mt Penn	PA		
Van Horn; Stephanie	Pottstown	PA		
Zalacain; Magdalena	West Chester	PA		

US-CL-CURRENT: 424/244.1; 424/185.1, 424/190.1, 424/192.1, 424/200.1, 424/234.1, 435/183, 435/69.1, 435/69.3, 435/69.7, 435/71.1, 530/350, 536/23.7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 13. Document ID: US 6162433 A

L12: Entry 13 of 21 File: USPT Dec 19, 2000

US-PAT-NO: 6162433
DOCUMENT-IDENTIFIER: US 6162433 A

TITLE: Non antibiotic selectable markers for live vaccines

DATE-ISSUED: December 19, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Khan; Mohammed Anjam	Newcastle upon Tyne			GBX
McNeill; Hesta Varey	Newcastle upon Tyne			GBX
Hormaeche; Carlos Estenio	Newcastle upon Tyne			GBX

US-CL-CURRENT: 424/184.1; 424/190.1, 424/200.1, 424/201.1, 424/203.1, 424/204.1, 424/246.1, 424/254.1, 424/257.1, 424/258.1, 424/261.1, 424/264.1, 424/265.1, 424/269.1, 424/270.1, 424/272.1, 435/252.3, 435/252.33, 435/320.1, 435/69.3, 435/91.4

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 14. Document ID: US 6054134 A

L12: Entry 14 of 21 File: USPT Apr 25, 2000

US-PAT-NO: 6054134
DOCUMENT-IDENTIFIER: US 6054134 A

TITLE: Haemophilus adhesin protein

DATE-ISSUED: April 25, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Lingwood; Clifford A.	Toronto			CAX

US-CL-CURRENT: 424/256.1; 424/185.1, 424/190.1, 424/200.1, 424/234.1, 424/241.1, 435/69.1, 435/69.3, 530/350, 536/23.1, 536/23.7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 15. Document ID: US 6051239 A

L12: Entry 15 of 21 File: USPT Apr 18, 2000

US-PAT-NO: 6051239
DOCUMENT-IDENTIFIER: US 6051239 A

TITLE: Compositions and methods for systemic delivery of oral vaccines and therapeutic agents

DATE-ISSUED: April 18, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Simpson; Lance	Moorestown	NJ		
Kiyatkin; Nikita	Cherry Hill	NJ		
Maksymowych; Andrew	Gulph Mills	PA		

US-CL-CURRENT: 424/239.1; 424/190.1, 424/192.1, 424/832, 435/69.3, 435/69.7, 530/350

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 16. Document ID: US 6001372 A

L12: Entry 16 of 21 File: USPT Dec 14, 1999

US-PAT-NO: 6001372
DOCUMENT-IDENTIFIER: US 6001372 A

TITLE: Antigenic peptides of Chlamydia trachomatis

DATE-ISSUED: December 14, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
DeMars; Robert I.	Madison	WI		
Ortiz; Linette	Pardeeville	WI		

US-CL-CURRENT: 424/263.1; 424/184.1, 424/185.1, 424/190.1, 424/234.1, 530/326, 530/328, 530/350

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 17. Document ID: US 5989884 A

L12: Entry 17 of 21 File: USPT Nov 23, 1999

US-PAT-NO: 5989884
DOCUMENT-IDENTIFIER: US 5989884 A

TITLE: HisS polypeptides from Chlamydia trachomatis

DATE-ISSUED: November 23, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Brown; James R	Berwyn	PA		
Lawlor; Elizabeth J	Malvern	PA		
Reichard; Raymond W	Quakertown	PA		

US-CL-CURRENT: 435/193; 424/184.1, 424/185.1, 424/190.1, 424/192.1, 424/263.1, 435/183

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 18. Document ID: US 5989553 A

L12: Entry 18 of 21 File: USPT Nov 23, 1999

US-PAT-NO: 5989553
DOCUMENT-IDENTIFIER: US 5989553 A

TITLE: Expression library immunization

DATE-ISSUED: November 23, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Johnston; Stephen A.	Dallas	TX		
Barry; Michael A.	Carrollton	TX		
Lai; Wayne C.	Richardson	TX		

US-CL-CURRENT: 424/190.1; 424/184.1, 424/185.1, 424/188.1, 424/201.1, 424/207.1, 424/208.1, 424/234.1, 424/248.1, 424/263.1, 424/264.1, 435/325, 435/440, 435/455, 435/489, 514/2, 530/403, 530/806, 530/825, 530/826, 530/868

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 19. Document ID: US 5962636 A

L12: Entry 19 of 21 File: USPT Oct 5, 1999

US-PAT-NO: 5962636
DOCUMENT-IDENTIFIER: US 5962636 A

TITLE: Peptides capable of modulating inflammatory heart disease

DATE-ISSUED: October 5, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bachmaier; Kurt	Toronto			CAX
Hessel; Andrew John	Toronto			CAX
Neu; Nickolaus	Innsbruck			ATX
Penninger; Josef Martin	Toronto			CAX

US-CL-CURRENT: 530/326; 424/185.1, 424/190.1, 530/327

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 20. Document ID: US 5961979 A

L12: Entry 20 of 21 File: USPT Oct 5, 1999

US-PAT-NO: 5961979
DOCUMENT-IDENTIFIER: US 5961979 A

TITLE: Stress protein-peptide complexes as prophylactic and therapeutic vaccines against intracellular pathogens

DATE-ISSUED: October 5, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Srivastava; Pramod K.	Riverdale	NY		

US-CL-CURRENT: 424/193.1; 424/190.1, 424/191.1, 424/192.1, 424/196.11, 424/197.11, 514/2, 514/21, 530/412

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments KWIC | Draw Desc | Image

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☐ 21. Document ID: US 5858367 A

L12: Entry 21 of 21 File: USPT Jan 12, 1999

US-PAT-NO: 5858367
DOCUMENT-IDENTIFIER: US 5858367 A

TITLE: Methods for screening for antimicrobials utilizing AarC and compositions thereof

DATE-ISSUED: January 12, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rather; Philip N.	Cleveland Heights	OH		

US-CL-CURRENT: 424/190.1; 424/185.1, 424/193.1, 424/194.1, 424/234.1, 424/246.1, 424/257.1, 530/350, 530/825

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments

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